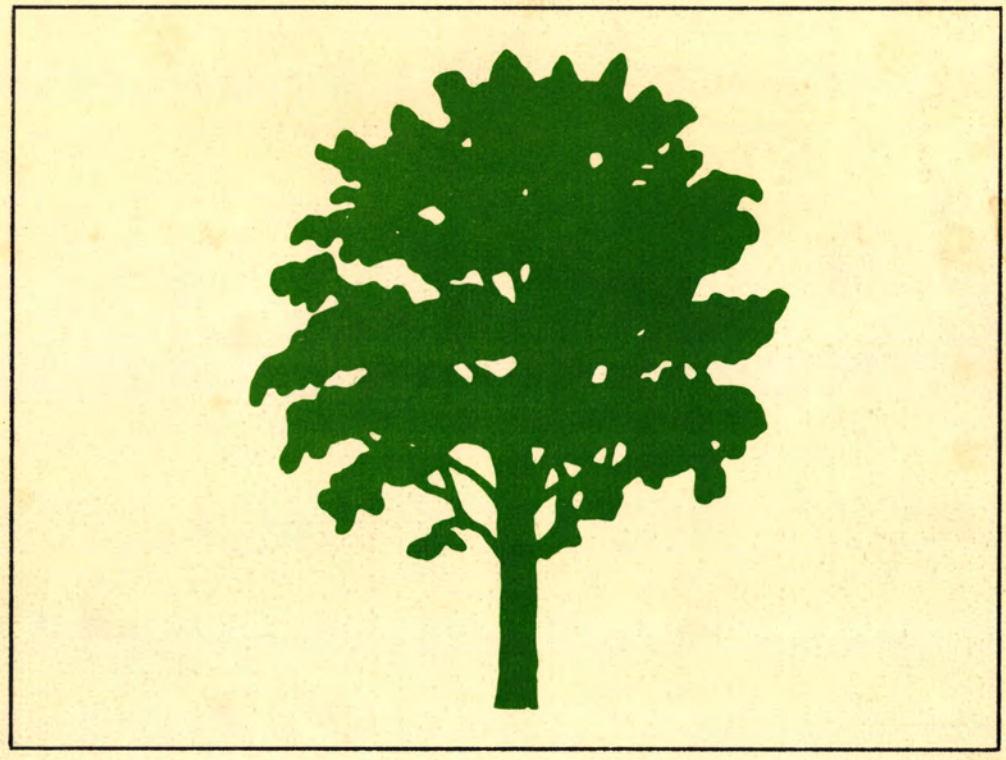
Nature Study



REPORTS OF WORKSHOPS IN

ENVIRONMENTAL EDUCATION PRACTICES

CONDUCTED AT THE
FIRST NATIONAL CONGRESS FOR
ENVIRONMENTAL EDUCATION FUTURES
BURLINGTON, VT., AUGUST 12-17, 1983

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About This Issue...

The American Nature Study Society, together with the Conservation Education Association, sponsored the *First National Congress for Environmental Education Futures: Policies and Practices,* held in Burlington, Vermont, August 12-17, 1983. The two tracks of the conference, Policies and Practices, were conducted concurrently. ANSS President Talbert Spence coordinated the Practices Track, putting together fifty-four workshops. This issue of *Nature Study* is devoted exclusively to reports of these workshops. Of the fifty-four, thirty-seven are recorded here. (A number of the workshops were field trips or hands-on demonstrations, not suitable for a publishable report, and are thus not included.) This issue, then, serves as a record of the Proceedings of the Congress for the Practices Track.

The Policies Track, under the direction of Lynn M. Hodges of TVA, developed a series of papers and recommendations which, with the plenary sessions, are published separately by the Alliance for Environmental Education, the coordinating organization for the Congress. These Policy Track proceedings have been produced by the SMEAC Information Reference Center, The Ohio State University, Columbus, OH 43212.

This issue of *Nature Study,* in addition to being sent to all members of ANSS, is being distributed to Congress participants who indicated they wished to receive the Proceedings.

Additional copies of this issue may be obtained for $6.00 (plus $1.00 postage) by writing:
John A. Gustafson, R.D. 1, Box 195, Homer, NY 13077. Make checks payable to ANSS.

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PROCEEDINGS...

of the

FIRST NATIONAL CONGRESS FOR ENVIRONMENTAL EDUCATION FUTURES:

PRACTICES TRACK WORKSHOPS

A Special Issue of *Nature Study,* Volume 37, Numbers 3 & 4
The American Nature Study Society

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PRACTICES TRACK WORKSHOPS

PROJECT WILD — FROM AWARENESS TO ACTION!

Facilitators: Cheryl Charles, Director; Rudy Schafer, Western Regional Environmental Education Council and Chair, Project WILD Steering Committee.

This practices session served as an introduction to the new, environmental and conservation education program emphasizing wildlife—Project WILD.

Project WILD is designed to be an instructional resource for educators working with kindergarten through high school age young people. The project is producing two instructional activity guides, with additional materials expected over time.

Project WILD originated in the western United States, with the two principal sponsors being the Western Regional Environmental Education Council (WREEC), a not-for-profit organization of the departments of education and resource management agencies in 13 western states; and the Western Association of Fish and Wildlife Agencies, an organization of the directors of the state agencies responsible for wildlife management in the western states. These two principal sponsoring organizations have made it possible for other organizations and states to participate in Project WILD; thus, at the time of the National Congress, Virginia, Florida, Pennsylvania, Tennessee, Kentucky, Minnesota, and Oklahoma, as well as the American Humane Association, Defenders of Wildlife, Canadian Wildlife Federation, and the National Federation had become sponsors, with others actively considering their participation.

For instructional purposes in Project WILD, wildlife is defined as any non-domesticated animal. Wildlife includes, but is not limited to, insects, spiders, birds, reptiles, amphibians, fish, and mammals—if non-domesticated. Wildlife, broadly defined, exists all around us—including urban, suburban, and rural settings. Although there are many important concepts in the program, the major theme throughout Project WILD is the importance of habitat. The goal of Project WILD is to assist learners of any age in developing awareness, knowledge, skills, and commitment to result in informed decisions, responsible behavior, and constructive actions concerning wildlife and the environment upon which all life depends.

The instructional activities that form the basis of Project WILD were developed by classroom teachers, resource agency personnel, representatives of private conservation groups and others. Each of the two Project WILD Activity Guides contains approximately 80 activities—including background information, procedures, and ways to evaluate student learning. The activities are designed for incorporation within all major school subject and skill areas, from kindergarten through high school, and correspond to a highly-respected content outline which serves as a framework for the program. All of the materials were thoroughly tested in two full years of formal evaluation in classroom settings.

At the time of the National Congress, the materials were available in a field-test form only. The program officially became available as an instructional resource in September, 1983. Following is a sample Project WILD activity. For additional information about the program's availability, please contact: Project WILD, Salina Star Route, Boulder, CO 80302; attention Cheryl Charles, Director.

Objectives Students will be able to: 1) examine their own values and beliefs related to wildlife and other elements of the environment; and 2) evaluate possible actions they might take that have impact on wildlife and the environment.

Method Students read, discuss, make judgments, and write about hypothetical dilemmas concerning wildlife and/or natural resources.

Background This activity is designed to give students the opportunity to examine their own values and beliefs as they relate to wildlife and other elements of the environment. It is not the intent of this activity to prescribe "right" or "wrong" answers for the students, except in the areas where information about laws is conveyed. It is the major purpose of this activity to provide students with an opportunity to come to their own judgments about what they think would be the most responsible and appropriate actions to take in each situation that is described.

Materials Copies of "dilemma cards"

Procedure 1. The teacher should copy and cut up the dilemma cards. Other dilemmas could be written that are more specific to problems in your area. Students could also be involved in the process of creating the dilemma cards, with each student responsible for one card.

2. Divide the class into groups of four, and give each group a stack of dilemma cards. Place them face down at the center of the group.

3. The first player draws a card from the top of the stack. The player has two minutes to study the situation, decide what he or she would do, and formulate his or her reasons.

4. When the allotted two minutes is up, the player reads the situation and the options aloud to the rest of the group. The student gives the decision he or she has chosen, and briefly describes the reasoning involved.

5. Without consultation, the other players decide to what degree each agrees with the first player's answer. Rating is done on a scale ranging from zero through ten points with zero representing total disagreement with the decision and ten representing total agreement. A rating of five would be given when the rater is uncertain of his or her opinion, indifferent to the player's decision, or feels more information is needed. (Additional information needed should be specified.)

6. Each of the players, in turn, announces how he or she has rated the first player's decision and the reasons for their views. This part of the activity should be limited to five minutes. The person whose response is being discussed should have the opportunity to ask questions and offer clarification. The rating is not to represent any kind of judgment of the person; it does give the students experience in having ideas

examined by peers, and is intended to remind the students of the need to take personal responsibility for decision-making. It is not necessary and may not be desirable for the students to reach consensus; there are legitimately ranging views of the most appropriate and responsible actions to take in many situations. The purpose is to provide students with an opportunity to examine, express, clarify, and take responsibility for their own reasoning.

7. The card is then returned to the bottom of the stack and the next player selects a card from the top of the deck. Continue this process until all students have had the opportunity to express their decision and rationale about a dilemma.

DILEMMA CARDS

– 1 –

You have been issued a once in a lifetime bighorn sheep permit and have spent two months scouting an area before the season. You have seen a ram that is record size. The season opens and you can't find the big sheep. You hunt the entire season, and on the last afternoon of the hunt you see a very good ram. Realizing this could be your last chance for a sheep, you shoot the ram. Suddenly, the large ram walks out of a ravine 50 yards away. Do you:
- ignore it and start cleaning the smaller ram
- shoot the big ram and leave the smaller ram for the coyotes
- shoot the big ram and bury the smaller ram
- take a picture of the big ram and keep the smaller ram
- shoot the big ram, cut its head off and hide it, to get the dried skull in the spring and say you found it
- other

– 2 –

You are president of a large corporation. You are very interested in pollution control and have had a task force in the company reviewing the pollution your plant is creating. The task force reports that you are barely within the legal requirements, but are adding more than your share of pollution to the community. To add the necessary equipment to reduce pollution would cost so much that you would have to fire 50 employees. Do you:
- add the equipment and fire the employees
- not add the equipment
- wait a few years to see if the cost of the equipment will drop
- other.

– 3 –

You are a member of a country club that has recently voted to build a game farm to raise animals for members to hunt. You are not a hunter, you think that hunting is only okay to do in the wild, and you are opposed to the building of the game farm. Do you:
- stay in the club and do nothing
- stay in the club and speak out strongly against the project
- resign from the club
- other

– 4 –

You are fishing at a secluded lake and have caught seven fish during your first day at the lake. Now, on the second day, the fishing has been great and you have caught five fish in the first hour, all of which are bigger than yesterday's fish. The law allows you to possess 12 fish. Do you:
- continue to fish and keep all the fish
- continue to fish and keep only the biggest ones you catch today, to stay within your limit
- dispose of the smaller fish you caught yesterday and keep the big ones to stay within your limit
- have fish for lunch
- other.

– 5 –

You are head of a task force created to select the best course of action to attempt to preserve the California condor. There are 22 condors left in a steadily declining population. Left to their own, it is probable they will all die. Some members of your task force would like you to authorize capturing some of the condors and sending them to zoos to try to propagate them in captivity. Do you:
- leave them in their natural environment
- capture some of them for zoos
- other

– 6 –

You are finally able to build the home your family has dreamed about. After reviewing the plans for your home, you realize that you cannot include all of the features you had planned for, due to rising construction costs. You must decide which one of the following you will include:
- solar heating
- recreation room with fireplace
- swimming pool
- hot tub and sauna
- other

– 7 –

You love children and would like to have a large family. You are aware, however, of the world's population projections for the future. Do you:
- plan to have a large family anyway
- decide not to have children
- limit yourself to one or two children
- other

– 8 –

You have found a young screech owl which you have managed to raise to maturity. You cannot keep the owl any longer in your apartment. Do you:
- offer it to your local zoo
- release it back into the wild
- keep it as a pet
- call the fish and game department and ask their advice
- other

– 9 –

You are walking in the woods and come upon a young fawn. There is no sign of the fawn's mother. Do you:
- leave it where it is
- move it to a sheltered area
- take it home
- other

– 10 –

You are deer hunting with a friend when you spot a hawk perched on a high limb. Before you realize what is happening, your friend shoots the hawk. An hour later, you are leaving the woods and are approached by a game warden, who tells you a hawk has been illegally shot and asks if you know anything about it. Do you:
- deny any knowledge of the incident
- admit your friend did it
- make up a story implicating someone else
- say nothing, but call up later with an anonymous phone tip
- other

– 11 –

You have purchased a beautiful ten acre property in the mountains to build a summer home. One hillside of the property has a beautiful view of valley and lake below and is your choice for your homesite. However, you discover there is an active bald eagle nest site on that hillside. The bald eagle is sensitive to disturbance around its nest tree and is a protected species. Bald eagles are highly selective in choosing nest sites and usually return to the same nest year after year. Do you:
- select a different site on the property to build your home
- sell the property
- chop down the tree and build your home
- other

(continued on page 27)

POPULATION AND THE ENVIRONMENT
Getting the Student Involved

Nancy Fitzpatrick, *Education Program Zero Population Growth, Inc.*

Population education is a multidisciplinary course of study where students examine the nature and meaning of relationships between population trends and environmental and resource issues. They learn not only about the consequences of these relationships, but more importantly, how their own decisions serve as causes. All people are "population actors" and throughout their lives make population-related decisions which affect reproductive, migratory, voting, and consumption trends. They make these decisions as individuals, and as members of family, community or country. Collectively, these decisions shape the nature of population dynamics and the resulting effects on the environment.

But these concepts are not easy to master, and solutions to population and environmentally-related dilemmas which ultimately affect us are even more elusive. We cannot expect our students to make informed choices about population and environmental issues as adults unless they have been taught the fundamentals and have been given the opportunity to practice and manipulate different population and environmentally-related variables in the classroom.

Zero Population Growth's goal is to train educators who wish to enhance their classroom curriculum and also to overcome the perception that population topics are too difficult for classroom discussion. This workshop is based upon a value-fair approach. That is, activities and information that permit teacher-participants (and ultimately their students) to draw their own conclusions about population issues, are presented. Long-lasting change comes from a person's own involvement with issues, weighing information and research findings and finally integrating such learning into one's own set of values.

SCRIPT FOR CONDUCTING FOOD FOR THOUGHT SIMULATION

Developed by Marge Dahlin and Elaine Murphy as Assistant Director and Director of the Population Education Project at Zero Population Growth, Washington, D.C.

PROPS:

Assorted colors of yarn for 6 "continents;" see "Diagram for Continent Game—Sample Floor Plan" on page 7 of this section for size of each continent.

Masking tape (to tape yarn to floor)

Ambassadors' cards (page 6)

6 placards labeled with names of continents (or paper signs with pins)—optional

Long loaf of French or Italian bread, unsliced

Bread knife

For variation: Hershey's chocolate kisses and 1 pound of peanuts in the shell

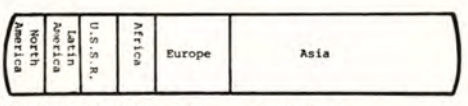
BEFORE PRESENTATION:

1. Arrange yarn for continents in random shapes on the floor and tape down. (Choose an out-of-the-way space to avoid people's tripping over yarn)

2. Mark off bread *as shown below* with knife (i.e. partially slice). You might wish to label name of each continent on appropriate segment with a felt tip pen. (If so, be sure to warn participants not to eat that part!).

3. Estimate number of participants. The following script is designed to use a total of 25, 30, or 50 "citizens" in the continents. Of course one can adapt the game for other numbers. "Extra" people can form a United Nations International Advisory Board. Ask these advisors to observe this game keenly and at the end of the game (or for homework!) to recommend at least three policies to help deal with population/food/income inequalities among nations. They might consider, for example, whether or not these inequalities *are* problems, and might contemplate such questions as: 1) Should food aid be given to countries which have not yet come to grips with their "population problems"? 2) On the other hand, have donor nations the right to link food aid to certain policies? 3) Should rich countries reduce their consumption levels? How could this be encouraged or enforced? (The teacher might write these or similar questions on index cards to give to the advisory board.)

How to Divide Bread:



SCRIPT:

I'd like to show you a simulation called "Food For Thought" which helps students gain an appreciation for world population distribution among continents as well as urban/rural dwelling patterns, arable or farmable land, and protein consumption.

First, I'm going to need 6 volunteers to be ambassadors from these land areas (if no one volunteers, quickly appoint; give each ambassador his/her ambassador's card.)

Would the ambassadors please choose some citizens to help populate their land areas. The ambassador from North America will need to pick ____ citizens (see table, page 6, for correct number of citizens based on number of participants). The ambassador from Latin America, ____ citizens; from U.S.S.R., ____ citizens; from Africa, ____ citizens; and from Europe, ____ citizens; all the rest of you can go populate Asia. Give sign (pin it on) or placard (labeled with name of continent) to ambassador.

Ambassadors, would you please tell us something about your land areas by reading the little card you've been given. First, let's hear from the North American ambassador (then ask to hear from the Latin American, Soviet, African, European, and Asian ambassadors. Then, if possible, use overhead transparencies, slides, or posters to compare and illustrate differences between continents on variables such as infant mortality rate, birth rate, growth rate, doubling time, life expectancy, etc. For example, students might make one poster to illustrate each variable.)

(The following information is also given on the Continent Diagram, page 7, and can replace the script.)

LAND AREAS

Next, let's look at land areas and how they're used. How many people are there compared to the amount of land in each continent? How many people live in cities? How much agricultural land is there per person?

North America has 16% of the world's land area but has 6% of the world's population. In North America, ¾ of the population lives in urban areas.* So, North American ambas-

*See diagram for proportions of urban dwellers in each continent.

sador, would you please have ¾ of your people stand on the border of the continent, away from the countryside. The remaining ¼ can spread out over the countryside. Now, unfortunately, not all of the land in the countryside is arable, or capable of being farmed. So farmers, you're going to have to compress yourselves into parts of your continents. In North America, only ¼ of the continent is arable, so farmers, would you move into ¼ of the total space?**

Latin America has 15% of the world's land area but has 8% of the world's population. In Latin America, ½ of the population is urban. So Latin American ambassador, would you have ½ of your people stand on the border, and the rest spread over the countryside. In Latin America, only ⅓ of the land is arable, so would the farmers please move into ⅓ of the space?

Africa has 22% of the world's land area but has 10% of the world's population. In Africa, ¼ of the people live in cities; so would the African ambassador have ¼ of the citizens move to the border? In Africa, ⅓ of the land is farmable, so farmers, would you move into ⅓ of the space?

Europe has 4% of the world's land area but has 11% of the world's population. In Europe, ⅔ of the population is urban, so Mr. (Ms.) European ambassador, would you have ⅔ of your people stand on the border? But, in Europe, only ½ of the land is agricultural, so farmers please move into ½ of the remaining space. (For Asia and USSR, turn to diagrams, last page. Continue as above.)

Let's summarize what we've seen so far. We've shown the distribution of the world's population by continent. We've looked at the urban-rural distributions of each continent's population. And we've also seen the proportion of arable land in each continent. This demonstration provides an answer to people who say, "With all that land to farm, how can there be food scarcity?" We see that there is much less agricultural land per continent than most people think.

PROTEIN CONSUMPTION IN EACH CONTINENT

Finally, let's look at the protein consumption in these continents. This loaf of bread (hold up) represents protein consumption per day in the world. I have marked it off to show the difference in consumption among continents.

North America gets 1/12 of this loaf. Would the North American ambassador please come up to get his/her continent's share of the world's protein and distribute it among the population as you see fit.

Latin America also gets 1/12 of this loaf. Would the Latin American ambassador...

(Proceed similarly. USSR: 1/12; Africa: 1/12; Europe: 2/12; and Asia: 6/12.)

(At this stage of the exercise, interesting things might happen. For example, how do the people feel if the ambassador keeps too much food for himself or doesn't distribute it fairly among the citizens? Will there be a revolution? Will some citizens steal food from each other? Will there be [legal/illegal] immigration to a country which has more food?)

VARIATIONS

There are several variations or "spin-offs" of this simulation:

1. *Per Capita GNP.* This variation uses Hershey's chocolate kisses to represent per capita GNP in each continent. You can get this information on each continent from the World Data Sheet in your teachers' resource kits. Or better yet, you can have the students look it up. Let each candy represent $100 per capita GNP. For example, North America has a per capita GNP (1980 statistics) of $9650. Thus, it would get 96 or 97 candies, contained in a plastic bag. Distribute to ambassadors as before.

2. *Distribution of World Protein Per Capita.* Peanuts (in the shell) may be distributed to the ambassadors of the various continents according to both "ideal" and "real" world situations.

Before class, measure out peanuts onto paper plates according to the table below. Jot down the figures below on the edge of each plate for easy reference during the demonstration.

To demonstrate: hold up paper plate with the "ideal quantity" to show citizens of each continent how much they "should" be getting. Then remove a portion of the peanuts in order to portray the correct quantity for the "real" world. For example, teacher might say: "Would the Asian ambassador please come up and get the protein supply for Asia? If Asia were a well-fed region, all 29 of you would get 3 peanuts each, totaling 87 peanuts. Unfortunately, you only get 58 peanuts (sweep off 29 peanuts, perhaps pre-divided on the plate using a cardboard strip or plastic bag.) Now Mr./Ms. Ambassador, would you please distribute these peanuts as you see fit, or according to the political realities of your region? Asian citizens, if your ambassador distributes the protein equitably, each of you would get only 2 peanuts." (Repeat for other continents.)

3. *Dinner.* One teacher who used this game asked students' parents to prepare a dinner. Students sold tickets to the dinner. Each person had ⅓ of a chance to get a complete chicken dinner, ⅓ of a chance to get an English muffin with butter, and ⅓ of a chance for plain rice. Each person was seated between those who had the other dinners.

Some people tried to steal their neighbors' food; some people shared. Some people ate in silence, feeling powerless, "just settling" for what they could get, or feeling no necessity to share with others.

After the dinner, in class, students talked about different ways people can react to inequities and to what extent we as a country have reacted in those ways.

AMBASSADORS' CARDS

The African Ambassador - green

I am the African Ambassador. Our population is estimated at 472 million; our birth rate is 46 per thousand, and our death rate is 17 per thousand. Our population is growing at an annual rate of 2.9 percent. At this rate our popula-

DISTRIBUTION OF PER CAPITA PROTEIN BY CONTINENT

Continent	Number of Participants	Number of Peanuts (Ideal World)*	Number of Peanuts (Real World)
N. America	3	9	9
U.S.S.R.	3	9	9
Europe	6	18	18
L. America	4	12	8
Asia	29	87	58
Africa	5	15	10

*This figure is based on an optimum protein standard of 100 grams per person. Each peanut represents 33⅓ grams, so the well-fed person should receive 3 peanuts.

**See diagram for proportions of arable land in each continent.

tion will double in 24 years. By the year 2000 we are projected to have 832 million people. Our infant mortality rate is 140 per thousand, and our life expectancy at birth is 49 years. For every person there is approximately 1¼ acres of arable land.

The European Ambassador - white

I am the European Ambassador. Our population is estimated at 484 million people; our birth rate is 14 per thousand, and our death rate is 10 per thousand. Our population is growing at an annual rate of 0.4 percent. At this rate we will double in 176 years. By the year 2000 we are projected to have 521 million people. Our infant mortality rate is 19 per thousand, and our life expectancy at birth is 72 years. For every person there is approximately ¾ acre of arable land.

The Asian Ambassador - red

I am the Asian Ambassador. Our population is estimated at 2 billion, 563 million. Our birth rate is 28 per thousand, and our death rate is 11 per thousand. Our population is growing at an annual rate of 1.8 percent. At this rate we will double in 39 years. By the year 2000 we are projected to have 3 billion, 578 million people. Our infant mortality rate is 103 per thousand, and our life expectancy at birth is 58 years. For every person there is approximately ½ acre of arable land.

The Soviet Ambassador - pink

I am the Soviet Ambassador. Our population is estimated at 266 million; our birth rate is 18 per thousand, and our death rate is 10 per thousand. Our population is growing at an annual rate of 0.8 percent. At this rate our population will double in 82 years. By the year 2000 we are projected to have 311 million people. Our infant mortality rate is 31 per thousand, and our life expectancy at birth is 70 years. For every person there are approximately 2¼ acres of arable land.

The Latin American Ambassdador -yellow

I am the Ambassador from Latin America. Our population is estimated today at 360 million. Our birth rate is 34 per thousand, and our death rate is 8 per thousand. Our population is growing at an annual rate of 2.6 percent. At this rate we will double in 26 years. By the year 2000 we are projected to have 595 million people. Our infant mortality is 85 per thousand, and our life expectancy at birth is 64 years. For every person there is approximately 1 acre of arable land.

The North American Ambassador - blue

I am the North American Ambassador. Our population is estimated at 247 million people; our birth rate is 16 per thousand. Our population is growing at an annual rate of 0.8 percent. At this rate our population will double in 87 years. By the year 2000 we are projected to have 289 million people. Our infant mortality rate is 13 per thousand, and our life expectancy at birth is 73 years. For every person there are approximately 2⅓ acres of arable land.

EXPLANATION:

Dimensions of land areas are shown for 50 participants; for 30 or less, simply double over the yarn and make them half the size. Areas need not be arranged in rectangles, but could be free-form if desired.

For 50 participants, use number on chart to indicate number of citizens from each area; for 25 participants use half as many as indicated. For other numbers of participants, reduce accordingly; for example, for 30, use number in margin.

ACCESS INFORMATION:

Film: "World Population"–3-minute color film. Distributed by Coronet Films, 65 E. South Water Street, Chicago, IL 60601; (800) 6231-7870; $95 purchase. $5 rental from Population Reference Bureau Film Library; Write: PRB, 2133 M Street, N.W., Washington, D.C. 20037. (202) 785-4664.

Population Quiz, Riddles, and Simulations: From ZPG's *Population Education Resources Kit.* Revised edition will be available from Zero Population Growth, Inc. late 1983. (See above for address). Price information not yet available.

Environmental Opinions: Activities from the Population Reference Bureau's Teaching Module: "The Environment To Come: A Global Summary." (1983). To order, write to PRB at address above (under "Film"). $2.00 (bulk prices available upon request.)

□

*Note: figures on this page are based on 1980 statistics.

Floor Plan for "Continent Diagram"

	North America	Europe	Asia	Latin America	U.S.S.R.	Africa
Size of rectangle for land area	8' x 10'	4' x 5'	10' x 10'	7.5' x 10'	8.3' x 10'	10' x 11'
% of World Land Area	16%	4%	20%	15%	16.5%	22%
% of World Population	6%	11%	58%	8%	6%	10%
Portion of Population in Urban Areas	3/4	2/3	1/4	2/3	2/3	1/4
Portion of Arable Land (Good Farmland)	1/4	1/2	1/3	1/3	1/4	1/3
With 50 players Citizens from each area	3	6	29	4	3	5
With 30 players Citizens from each area	2	3	18	2	2	3

TEN MINUTE FIELD TRIPS:
Using the School Grounds to Teach

Helen Ross Russell, *Environmental Education Consultant*

School grounds are the best possible place to initiate environmental education. They are a microcosm: a sample of the greater community in which students live. Not only are the natural forces all illustrated by community attitudes toward children, economic values, litter, animals and space are equally evident.

School grounds provide a resource for relating textbook concepts to everyday life and for understanding interrelationships which tie the world together. They are available for simple observations and experiments as well as for on-going studies and research. In some instances school grounds provide an area for active participation in environmental improvement.

They offer a safe area for teachers who have little outdoor knowledge since pre-planning trips poses no problem and selection of the site to fill the needs of the topic is simple. Often the custodian's assistance can be enlisted.

Teachers often hesitate to take field trips because they feel insecure and are sure that the class will ask things that they cannot answer. A well-planned school ground trip eliminates this. The purpose of the trip has already been determined in the classroom; the questions to be answered and observations to be made have been listed; equipment, if needed, has been distributed; children have trip boards or other recording devices. This is not a free-for-all into uncharted territory. It is not a "learning" of 20-50-100 things as the teacher may have experienced in a college field course. It is a tightly organized activity which fits in the setting of the classroom learning and greatly enriches it.

The length of the trip will vary with the topic and the class. Repeat trips may be made every hour, week, or month to record changes. Repeat trips may also be made to settle a controversy; no need to settle an argument about conflicting data when re-measurement can be carried out!

In any school system many topics will reappear over the years just as they do in classroom situations. Thus, the study of shadows by pre-schoolers is an observational, discovery activity which can challenge thinking ("make your shadow disappear"). Early elementary children may make a sundial or observe the change in size and position of their own shadows, while middle school children may make a monthly record of shadow length and position and correlate it to Earth's axis and movement. Both of these are strengthened as thinking, reasoning activities by asking for predictions of the next shadow position. High school students may repeat Erastothenes' measurements which enabled him to compute the circumference of the earth as 24,000 miles in 240 B.C.

Trees, too, offer opportunities for many types of studies. A tree can be an all year object of observation and chart making for pre-schoolers; while children in the primary or middle grades may keep individual records of individual trees. Middle school children can also use trees for measurement, math, and graphing studies (see *Nature Study* Vol. 36 Nos. 3 & 4).

Every school ground will provide some opportunity for animal study. (If the area is bare asphalt with no planted edges the lack of animals can be noted followed by a discussion of: why no animals? Can we change the situation? Where is the nearest food and shelter? (This may involve an around-the-block field trip.) Don't overlook invertebrates or miss the opportunity to do tracks in winter, even if they are only dog and human.

The possibilities of school ground learnings are almost limitless. Among them can be:

Weather and weather prediction.

Changes—growth, aging, decay, sun and shadows, leaf coloration, the moon, flowers to seeds, seeds to plants, oxidation, decomposition, disintegration.

Geology—local rocks, erratics, building materials, river systems after a rain, soil formation, deposition of silt, building tools.

Temperature—conduction, radiation, convection, wind, heat from buildings, people and cars, different absorption rates of different materials, different radiation rates, conclusions about rural/urban temperatures, role of trees.

Water—take a rainy day field trip to learn about run-off, deserts, plants and rain, river systems, water as a cleanser, water as a transporter, collect some rain water before it touches the ground, collect water from the gutter.

Recycling—the school ground is a perfect place to bury a variety of materials for a fortnight or longer and observe decomposition, or lack of it, decomposers at work, soil production.

Asking questions and seeking answers, experimenting, mapping, measuring and record keeping; when these skills are mastered horizons may be expanded and longer field trips taken; but always the school grounds are available for comparison, for new studies and for in-depth studies which cannot be undertaken or completed on a field trip far from the school base.

Obviously the school grounds should not be the province of one subject area. Like environmental education, studies should envelop social sciences as well as natural ones, language arts and art as well as math. Even politics and international education may be learned in part on the school site; for what better way to learn about political action than to try to bring about a change? Several years ago, ANSS member Fran Ludwig's class tackled the problem of black smoke being emitted by the school's furnace and learned a lot about city government in the process.

Any older class in the northern U.S., or any desert area, can appreciate the importance of world economy and interdependence if they stand outdoors on a winter day and search for the source of their oxygen.

The possibilities are endless, the resources great. Like a set of encyclopedias, the area just ouside the classroom is easy to use if we tackle one topic at a time. □

ENVIRONMENTAL ACTIVISM ROUNDTABLE

Dick Buegler, *President, Protectors of Pine Oak Woods (Staten Island, NY)*
Ray Pfortner, *U.S. Environmental Protection Agency Region II (NY, NY)*

Environmental activism is alive and well. Examples of projects that have been improved and even halted by concerned, informed, and active citizens, especially over the past 13 years and right up to the present, abound. Most recently, consider the obvious environmental concern—and activism—of the U.S. population as evidenced in the public opinion polls, in the support for our national park and forest system, the support for EPA as an agency, and the enormous swelling of the ranks of this nation's environmental organizations.

What is all-too-often lacking at the grassroots level, however, is proper networking. Citizens need to get together and share experiences and expertise, techniques and skills. The Worksheet and Summary Sheet included here together are designed to facilitate such a sharing among a group of, say ideally, about 15 people.

Worksheet

A. List all the environmental problems you can think of in *your* community.

B. Select one of the problems you listed above that especially concerns or interests you (and for which there is no imminent resolution) and describe it more fully.

1. How did you first become aware of the problem you selected?
2. Why are you particularly concerned about this problem?
3. What has been done about this problem in your community to date?
4. If you were to tackle this problem, what goal(s) or objective(s) would you set for yourself?
5. Devise an Action Plan (list as many steps as possible that you think will achieve your goal(s).
6. How would you enlist support, and from whom?
7. List the problems and difficulties that you would anticipate encountering in implementing your Action Plan.

First, brief introductions should be made, preferably by having each person learn about and then introduce the person to their right. Then, after a brief overview of the range of environmental activism success stories,. let the participants complete A and B of the Worksheet in writing individually. Go around the room and have each participant read aloud first her/his full list under A, and then read the response to B without any questions, discussion, or amplification at this time.

Next, have the group complete questions 1 through 7 as expeditiously as possible. Then, with the full group, choose one person's selected problem (as identified in B) that seems the most immediately manageable and have that person read her/his responses to items 1 through 4. Discuss as a group how reasonable the established goal(s) (item 4) is (are), and focus the goal(s) through group discussion. Now have the person read her/his responses to items 5, 6, and 7. Discuss the action plan in detail, and try to draw upon everyone's experiences and skills, particularly in suggesting whose support to enlist.

If time permits, break the full group into as many smaller groups as you have facilitators to guide the discussions. Form the groups around similar responses to item B (e.g., land preservation, water issues, pesticides/toxics/hazardous wastes, resource recovery/litter/solid waste, vandalism/crime). Run through the same sequence of exercises above for items 1 through 7, selecting one (and, if time permits, a second) problem of interest to the entire new subgroup and also holding the promise of being good food for thought. Again, foster a sharing of ideas, approaches, and solutions.

Re-assemble the full group, and have each facilitator report on the highlights of her/his subgroup's discussion. Then allow time to complete the Summary Sheet questions below. Each participant should first complete the questions in writing, and then take a few moments to share his responses to items I through IV verbally with the full group.

Summary Sheet

I. What new environmental problems do you now perceive in your community?

II. What problem(s) in your community are you going to tackle next?

III. Whom will you enlist for support?

IV. What are some of the actions you will take next?

Finally, the facilitators should close the session by pointing out the wealth of expertise and pointed advice available from those assembled in the group. Recount the sizeable number of environmental problems identified by those present, but the equally sizeable list of approaches and resources shared, all of which, if properly marshaled, could go far toward solving those problems.

Try this exercise and we think you will amply prove that environmental activism is very much alive and well and flourishing all around us. And that networking, assembling our separate knowhow, is our most powerful tool. □

LEARNING BY DESIGN

Alan R. Sandler: Director
Public Education
American Institute of Architects
Washington, D.C.

A hands-on exploration of how we learn, perceive, and make decisions about the environment. Participants will discover their teaching/learning styles, explore the design process as a decision-making tool, and experience the process of locating local resources for classroom use. The presentation includes group discussions, a slide presentation, hands-on experiences, and options for self-discovery and personal use of the materials.

Presentation Outline.

1. Perception of Space
   - Feelings About the Environment (activity)
   a. Using the environmental evaluation sheet, have each person evaluate the space (room) which they are in.
   b. Divide the group into subgroups consisting of those occupying similar spaces within the room. Have them compare their evaluations and record those criteria on which they unanimously agree and on which there is strong consensus.
   c. Ask each group to present its findings. Compare the opinions of the various groups and invite group discussion relative to the differences of opinion occurring between groups occupying different areas of the room.

2. Introduction to "Learning by Design"–The American Institute of Architects Environmental Education Program
   - Slide show
3. Perception and Learning Styles
   - Discussion of learning modalities and brain dominance
   - Preferred perception modes
4. Resources for Classroom Use
   - Human Resources
     How to find an architect
   - Printed Resources
     The Sourcebook–a compendium of exemplary environmental education resources (see The City Issue, *Nature Study*, vol. 36, no. 3 & 4)
5. Personal Space (activity)
   a. Have each person select the space within the presentation room which he or she would like to occupy.
   b. Ask each person or a sampling of people to explain why they chose the space they did. What factors entered into the selection?
   c. On a large sheet of newsprint, have each person draw or describe his or her favorite childhood space. Introduce this assignment by having everyone close their eyes and think back to a place where they spent a lot of time when they were young.
   d. Tape the drawings up on the wall and have each person or a sampling of people explain their selections.
   e. See if there are any correlations between the spaces people have presently chosen and those which they describe as childhood favorite places. Invite group discussion.

One way to use the activity *How Do You Feel About Your Environment?* is to evaluate how you feel about a particular place. Then use the same form to describe what you would like to see in that environment as input for proposing change.

Another way to use this activity:

1. Hand out copies of the word* sheet and ask each person to evaluate the room the group is in or some other specific place that they will visit. All participants must be evaluating the same place.

2. The place must be small enough to allow the participants to complete the evaluation in from 10 to 20 minutes.

3. Divide the participants in groups of 3 or 4. Ask them to select a recorder. The recorder will score *only* the times when the whole group agreed—that is when they all marked the same sections between the two words. Repeat these instructions several times as they get started. Remind them that they are only to record—no changes are allowed!

4. When all the groups have finished, ask each group to tell how many times they all agreed. It will be none or very few in every case.

5. Ask the whole group to comment on what this activity suggests. Some possibilities are:

a. We all see things in different ways and in different degrees.

b. We need to listen to the opinions of others and to respect their feelings.

c. We might make different choices on another day—if it weren't raining—if we weren't hungry—or depending on how we feel or what has happened just previously.

d. Background makes a difference—what one person perceives as large may be small to another.

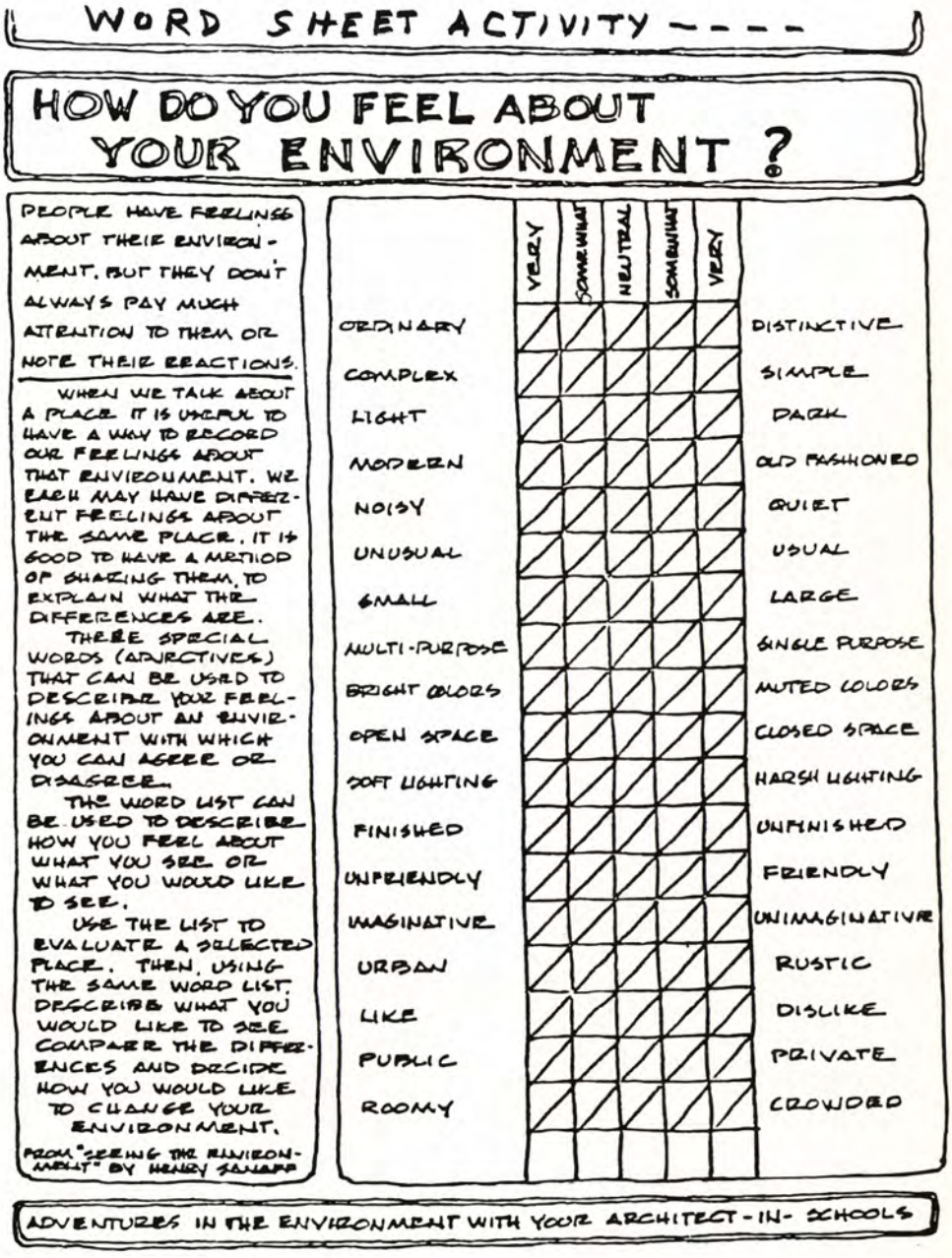
What does this tell us about participating in environmental change?

1. Many points of view must be considered.

2. Decisions will usually involve trade-offs.

3. If good decisions are to be made, it takes data-gathering, research, analyses and evalution before action. □

*Obviously the pairs of words can be changed to accommodate each situation.



INVOKING THE WHOLE LIFE FACTOR:
A Cross Cultural Approach to Environmental Education

Michael J. Cohen, *Director, National Audubon Society Expedition Institute*

At National Audubon Society Expedition Institute, we have trained students to experience "Organism Earth" to be alive, invoke a whole life factor (a planet's-eye point of view) into their everyday lives, and use the globally congruent meanings of nature, culture and self-preservation in order to perceive themselves as identical with, and as exploited as, the living planet. Cross-culturally, this approach has strengthened the wholeness and self-preservation feelings of our students by reducing their internal stress, and by improving their harmony with the environment.

The curriculum which we use in our classes is based on the following concepts that we call the **CNS paradigm:**

I. Our civilization recognizes three major aspects of the Planet Earth:

Culture (C)–The social environment that consists of everything we learn and know including the people-built physical environment.

Nature (N) –The non-people, interdependent environment of natural processes and materials, the natural resources that sustain life and survival.

Self (S)–Each person's consciousness of the life process as it exists within themselves.

Our civilization's ability to divide the planet into these unconnected, separately identifiable entities creates a consciousness that is incongruent with reality. Reality appears to be that the universe (nature), *including its human inhabitants* is a single integrated system. People's ability to conceptually divide the planet into separate life system environments has given people the license to incorrectly compare, compromise, or work one aspect of the environment against the other and assign different values to each.

America's division of the planet lays the foundations for the environmental, spiritual, and personal problems that presently confront us. Because nature has no language, people hear only the voice of their culture. For example, it is our culture that allows us to divide the universe into separate environments; other cultures do not recognize this division. We are contaminated by the prejudices of our culture's symbols and values. How can we learn to understand our relationship with nature if most of our tools for understanding are biased symbols and conditioning of our culture? Can we learn to see straight through warped glasses? Can we measure a curved line with a straight ruler?

II. In our curriculum, we have hypothesized that our present language and symbolization process must be modified to allow us to unite the separate environments (culture, nature, self) that are conceived by our culture. This we have done by applying the whole life factor and establishing new diagrammatic symbols for concepts and premises that appear to be ecologically sound and scientifically and culturally admissable. The premises are:

Symbols. Humanity's uniqueness in the ecosystem lies in people's ability to symbolize. We can see a tree. Without understanding its ecological role,we can label it with the word *tree,* thereby sticking its image into our mind, where it flourishes not only as an image and word for that tree, but for trees in general. We relate to trees through words and that tree symbol. We relate to huge portions of the universe through the imcomplete generalizations of symbols; although the chaotic state of the world reflects this quality of ours, that's how we operate.

The Living Earth. The planet earth appears to be a living organism, an energy system whose component parts are also alive and on some level communicate—be they plant, animal, or mineral. Through natural communication, the planet has maintained a supportive environment for organic life. The planet, universe, natural world, and nature all are one and the same thing. Each entity contains some degree of life.

Interconnectedness. Because the planet is integrated, all persons and things are interconnected, contain parts of one another, are influenced by the existence and state of one another, and are, at any given time, in the same state of being because of their interconnectedness. For example, if a person cuts down a tree the act is found in nature (the cut tree and its effects), culture (cutting a tree is condoned by our civilization), and self (I am conscious that I am cutter of trees).

Fluctuation. Nature's diversity of life continually fluctuates while seeking the life-sustaining balance alternately producing "tension and tension release" (T-R) in the relationships between its entities. The T-R is the voice of nature; it communicates the needs of the living planet: (for example, rabbit populations increase or decrease periodically, causing tension and release in predatory populations; climate fluctuates from hot to cold, wet to dry, windy to calm; planetary orbits have perigee and apogee). A whole life definition of nature is that nature is the T-R relationship that exists between any or all entities within the universe.

The Womb of Life. Through T-R adjustments, nature provides all the ingredients and parameters necessary to sustain life. *Nature is the womb of life.* Nature's life-giving function is replicated in the womb of mammals in order to sustain embryonic development. The womb environment is experienced and unconsciously remembered as feelings by the embryo, feelings of total well-being; womb-euphoric, harmonic, secure feelings. Womb feelings are a genetic memory of the substance, evolution, diversity, survival, and interdependence of life. They are experienced in an individual whenever tension is released because in nature the release of tension is a signal that life is being supported, that a life-giving niche is available to the organism. The womb is that niche for the embryo. Psychologically it is remembered as the ultimate niche.

Life. Within the whole life perspective, life is any T-R relationship that is conscious of itself and obtains gratification from maintaining or reproducing its T-R relationships. Within this definition, consciousness, communication, homeostasis, and emotionality are integral parts of the life process. Life might be called "loving to relate" and the Earth be considered the source of life as we know it.

Nature's Callings. People are the personification of nature. Every element of Nature is within the newborn baby and communicates with the infant from within. The newborn knows Nature intimately because it is Nature; Nature is all that it feels.

The pulse of Nature is the same as the life-giving adaptable heartbeat of an infant. The rivers, lakes, and seas of the planet establish contact with the

newborn through the child's feelings of thirst and moisture. Through its feelings of thirst, the child knows of the existence of rivers, even though it's never been near one. The presence of trees, flowers, soil, wildlife, and human life is known to the child by its cravings of hunger and loneliness. The recycling needs of the planet communicate themselves as a need to excrete. The infant's feelings recognize the existence of weather, seasons, landforms, and gravity; they appear as desires for shelter and support. Our felt need for an ecological niche tells us that we have Nature's support and approval. The absence of a niche is felt as anxiety or anger. Messages from sunlight and climate are heard in temperament, exhilaration, and temperature changes. Nature's love for us and the reproduction of our species is experienced in our romantic and sexual feelings. We experience the pulse of Nature as self-preservation awareness, the process of tension and tension-release that is needed to maintain life and a living equilibrium with the living planet. These feelings fluctuate because they are congruent to nature's life-sustaining fluctuations.

III. In order to symbolize and integrate what appear to be the present relationships between people, culture and nature, we diagrammed them on the premise that nature exists in the environment *and* in people.

Figure 1 illustrates that within the American environment and in the American individual, Nature, the whole-life process of the planet, is divided by our Culture's fortressing. This provides short-term security and womb-euphoric feelings emanating from the relief of natural tensions. In less fortressing Cultures, such as those of hunter-gatherers (figure 2), Culture parallels and does not excessively block contact with Nature; Natural tensions are more frequently released within the T-R framework of Natural fluctuations rather than in a technological, people-built environment such as present-day America. For example, the hunter-gatherers know where, when, and what wild foods should be in season as well as how to catch, prepare, and eat them. They can *hear* Nature. The diagrams convey that, comparatively, the average American is an imprisoned, pro-culture configuration of consciousness that seeks euphoric tension release from people-built technologies.

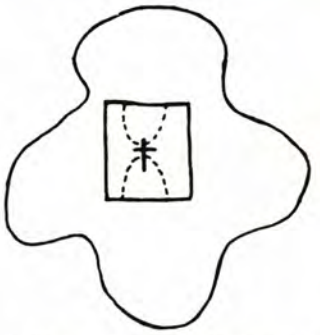


Figure 1. Diagram of the North American environment and the American mentality.

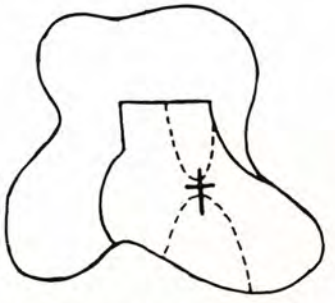
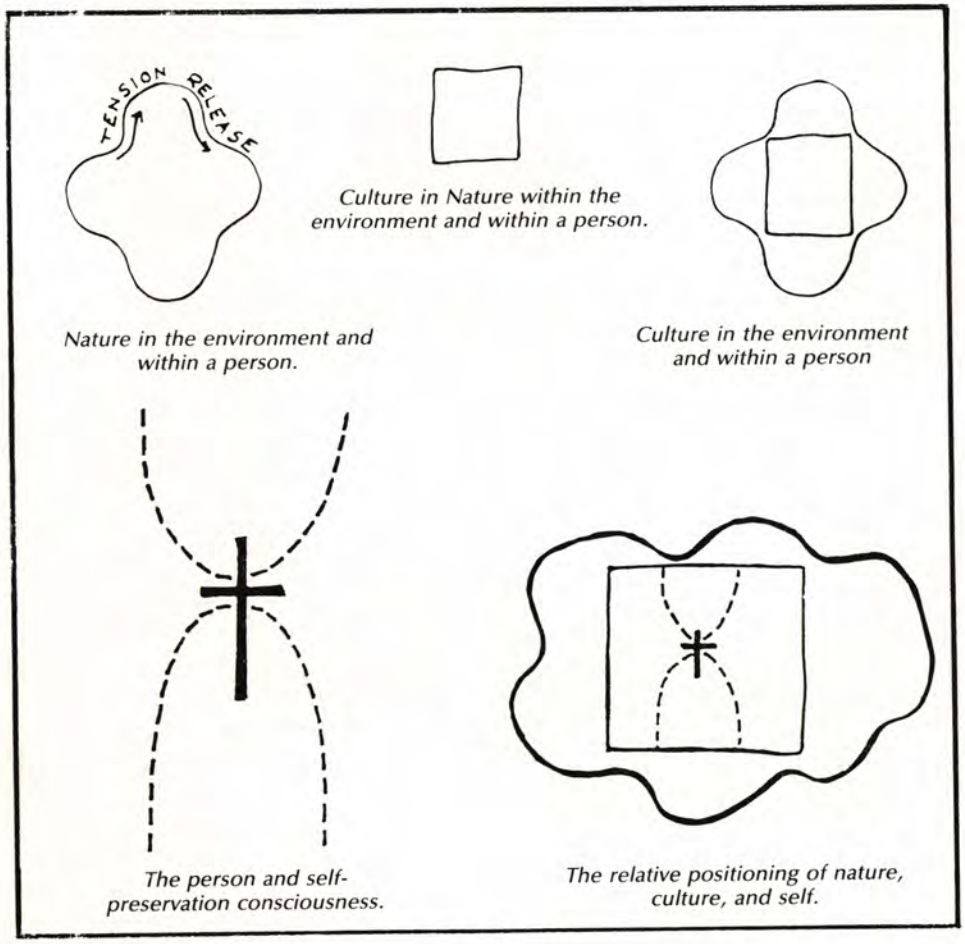


Figure 2. Diagram of the Hunter-gatherers' environment and of their mentality.



If Americans are to increase their mental health, the subconscious anxiety and depression caused by the internal thwarting of nature by mass-Culture must be minimized in American civilization and in the American people. Similarly, environmental health and equilibrium will increase in America when the destructive fortressing effects of Culture against Nature are reduced. The crux of people's wholeness is the conscious mind's contact and harmonious relationship with Natural feelings, the uncelebrated feelings of self-preservation: thirst, hunger, respiration, warmth, equilibrium, and companionship. Our acculturation demeans these natural feelings and converts their energies into culturally biased, but socio-economically acceptable feelings. We unconsciously learn to dislike Nature. To accomplish wholeness, the value of these forces and feelings of Nature must equalize and be compatible with those of Culture. We *must each personally experience that the Planet Earth exists deep inside ourselves on a feeling level, and that our cultural and social encounters are attached to the natural survival dynamics and T-R feelings of*

our internal planet. As we live out our acculturated daily lives we often find that the survival sensations of our internal planet are attached to our interactions. They are emotional signals that can lead us astray culturally if we don't recognize and properly interpret them. They can ask us to dependently satisfy them with excess cultural phenomena rather than the understanding and supportive interpersonal or nature-related satisfactions. For example, we can develop deeper friendships or a healthier environment rather than become fashionplates or millionaries.

Because Culture is so strong and encompassing, most Americans are not conscious of their alienation from Nature, nor of their Cultural desire to thwart Nature and thus obtain status and the comfort of the womb euphoria by being distant from Nature. Americans don't experience their alienation from Nature as being a problem of consciousness; instead we are aware of it as being problems of culture—of standard of living, natural resource shortages, mental illness, pollution, loneliness, economics, lifestyles, and religious conflicts. We are unaware that we seldom personally relate to Nature; it is our Culture that relates to Nature.

The formidable problem of contamination of T-R self-preservation feelings by Culture has appeared to be unresolvable; we are crippled by the reinforcing symbols and perception-warping manifestations of Culture. For example, we unknowingly poison ourselves as well as the environment by growing and using tobacco.

In order to break through our Cultural bonds, our curriculum strengthens the suppressed values and callings of Nature, *the planet within.* By encouraging the recognition, expression, and use of each person's Cultural or Natural feelings, and locating their feelings' source and whole life self-preservation value, the curriculum energizes Nature and person-planet congruency.

We have begun to make students aware of the importance and environmental congruency of the T-R emotionality. They have become consious that their *planet* feelings can be a source of life and survival. By constructively expressing and utilizing the energy of their feelings, our students break through their Cultural walls and make contact with Nature within and without. They stride toward harmony with the planet by having their self-preservation consciousness transcend the fortressing of Culture. The CNS paradigm becomes a therapeutic aid; a method by which young people can permanently locate and rectify the source of undue stress, anxiety, or depression.

Because our curriculum celebrates feelings rather than suppressing them, we have experienced a wholeness and vitality in our classes that was previously missing. Based on their feelings, students' analyses and reorganizations of their own relationships (with parents, friends, classmates, authorities, and institutions) have assumed importance equal to traditional academic understandings. Of utmost value is the recognition that one's good feelings toward life emanate from the planet and that they indicate a reduction of tension, a self-preserving global niche. Uncomfortable feelings, on the other hand, often originate in Cultural dictates that thwart natural self-preservation feelings.

The implications of the Audubon Expedition Institute's holistic curriculum can be further observed by considering a recent classroom discussion in which a young girl was told that she was hiding herself behind her hair fashions. It was noted by a student that a study showed that if Americans did not use hair driers, the energy saved would eliminate the nationwide need for nuclear power and the problems associated with it. We reflected on the adaptations that Americans could make (the reduced use of clothes driers, air conditioners, electric popcorn makers, etc.) that would reduce our Culture's impact on Nature and thereby bring us closer to equilibrium with Nature and the planet. We reflected on the realization that as Americans we often experience the need for such changes as *limitations on our personal freedoms* because our Culture has contaminated our consciousness.

The Whole Life Factor curriculum recognizes that the environmental problems and conflicted lives of Americans are outgrowths of our culture's conflicted relationship with the natural world. We perceive that we are each a living history book, a natural organism overwritten with the history of our Culture's attitudes toward Nature. As we learn history, and to identify and evaluate the cultural conditioning printed over our internal planet, we find the opportunity to change the incongruities that have divided the planet from ourselves. We discover that each moment of our lives is a historically unique integration of the many ancient forces and cycles of Nature, Culture, and ourselves, and that our choices can influence life. □

REFERENCES

Berry, Wendell. *The Unsettling of America.* Sierra Club Books, 1977.

Cohen, Michael J. *Prejudice Against Nature: A Guidebook for the Liberation of Self and Planet.* Freeport, Maine: Cobblesmith, 1983.

Commoner, Barry. *The Closing Circle.* New York, NY: Alfred Knopf, Inc. 1974.

Dubos, Renee. *So Human an Animal.* New York, NY: Scribners, 1976.

Farb, Peter. *Man's Rise to Civilization.* New York, NY: Avon Books, 1968.

Frank, Lawrence. in Falkner, Frank. *Human Development.* Philadelphia, PA: W. B. Saunders Co., 1966.

Jung, Karl. *Man and His Symbols.* Garden City, NY: Doubleday, 1964.

Malinowski, Bronislaw. *A Scientific Theory of Culture.* New York, New York: Oxford University Press, 1960.

Odum, Eugene P. *Fundamentals of Ecology.* Philadelphia, PA: W. B. Saunders Co., 1971.

Reich, Charles. *The Greening of America.* New York, NY: Random House, 1970.

Rogers, Carl. *On Becoming a Person.* Boston, MA: Houghton Mifflin.

Storer, John. *The Web of Life.* Greenwich, Conn: Devin-Adair, 1956.

ENVIRONMENTAL EDUCATION: Back to Basics

Robert Warpinski, *Director*
Project I-C-E (Instruction, Curriculum, Environment), Green Bay, Wisconsin

Taking into account what children and young students can be expected to learn and what teachers can be realistically expected to teach—I propose this very basic, very limited approach for a K-7 environmental education program.

First, because I am convinced that a concept-based approach is most viable, I propose the following concepts as the instructional framework:

1. *Energy,* in forms known and yet to be discovered, is essential for the operation of all systems in the universe.

2. The universe is a composite of many varied, intricate, interdependent and interactive *ecosystems.*

3. The quantity and quality of the available resources of water, air, minerals, vegetation, and animal life determine the *carrying capacity* of the universe.

4. All systems in the universe are in constant *change,* but only human beings have the ability to manage, manipulate and change the environment.

5. The principle of stewardship must guide all individuals in the public and private sector in decisions that affect the quality of life for people now and for future generations.

For these concept generalizations, there is the need to identify instructional objectives for each grade level. The constant reference being: what is really important (basic) for each child to experience or learn in relation to each concept at each grade level.

A major secondary consideration in such program development is to model it closely to the goals, objectives, and principles of the UNESCO/UNEP recommendations from the Tbilisi Conference. In other words, each instructional unit and the program as a whole ought to satisfy all or some of such goals, objectives, and principles as appropriate to the nature of the activity and level learner characteristics. There is appended a model draft lesson to illustrate the nature and format of such instructional units.

I am suggesting that we can arrive at a consensus, within this limited scope, on what are really some basic concepts that all children and students should have experience with. That we can identify or develop learning activities which relate to such concepts and with which most teachers would be comfortable, including the provision of all the materials necessary to use the activity. Also, that each activity be of such substance that it can be evaluated in terms of student achievement of the objectives, and that an aggregate, in part or in total, of the individual activity evaluations could be used in a pre-post manner to determine year-long achievement at each grade level. Those schools and teachers who feel the need for added emphasis on a particular local environmental concern or issue can draw upon the wealth of the other resources already available.

MODEL LESSON ON "SOURCES OF ENERGY"

Discipline Application: Science, Social Studies, Math, Grade 3
Suggested Topic/Unit: Our Sources of Energy
EE Orientation: Green plants basis for food and other energy sources
Performance Objective(s):
Through this activity series, children will have basic knowledge:
1. That sun energy is necessary for plants to grow;
2. That all food comes directly or indirectly from green plants;
3. That plants are the basis for energy forms (coal, oil, natural gas)

ENVIRONMENTAL CONCEPT GENERALIZATIONS

___ 1. Energy
___ 2. Ecosystems
___ 3. Resources
___ 4. Change
___ 5. Stewardship

UNESCO/UNEP APPLICATIONS

Goals:
– Develop concept of total interdependence
– Foster the need to protect & improve the environment
– Create new patterns of behavior

Objectives:
x Awareness
x Knowledge
x Attitudes
___ Skills
x Participation

Guiding Principles:
x Totality
x Lifelong Process
x Interdisciplinarity
x Global Perspectives
x Situational Focus
___ International Cooperation
___ Environment in Development
x Learner Role in Activities
x Relate to Learner Age
___ Discover Symptoms & Causes
___ Problem-Solving Skills
x Diverse Practical Activities

SUGGESTED RESOURCES

What's To Eat, U.S. Department of Agriculture Yearbook, 1979, U.S. Government Printing Office, Washington, D.C. 20420. #001-000-04041-3

TEACHER NOTES

This lesson and activities will require about three hours during a period of four weeks; Part 1 initiates the lesson and is ongoing; "2" might be timed for the period of plant growth, and "3" should be a concluding activity.

The performance check test on page 16 can be used as a pre-post evaluation instrument.

Test Key Answers:

1. b,d	4. a	7. a
2. c	5. b,c,d	8. a,c
3. b	6. b	9. a
		10. b

Vocabulary for energy activity

Sun	Production
Soil	Consumption
Water	Fossil Fuel
Sprout	Energy
Grow	Electricity
Photosynthesis	Import (buy)
Carbohydrates	Polar Region
Producer	Equatorial
Consumer	(Equator)

STUDENT-CENTERED LEARNING ACTIVITIES

1. How sun energy is necessary for plant growth—experimental activity.

Stage 1: Begin this unit on Sun Energy as a class project early in the school year.

a. Discuss with children what plants need to grow–sun, soil nutrients, and water.

b. As you discuss the above, plant three bean seeds ½ inch deep in each of three small flower pots (or suitable

container as a half-pint milk carton, a 1-lb. tub from margarine) together with sufficient potting soil.
c. Place all containers in a window any place with adequate daily exposure to the sun.
d. Have children keep simple tally of number of days for beans to sprout. (5-7 days)
e. Under the same conditions allow beans to grow to a height of 1½-2 inches (about 10 days); thin out, leaving one healthy plant in each container. (Children could record growth time.)

Stage 2: Upon completion of above period of time, discuss with children the term "photosynthesis"—how sun energy turns water and nutrients into starch-sugar (carbohydrates) which plants need to grow.
a. Experiment with plant growth by placing one plant under a box with no light; a second in a place with no direct sunlight; leave the remaining plant in the sunny window.
b. Water all plants uniformly as necessary, and keep them in position for two weeks (10 school days).
c. Provide each child with a form on which they can keep track of the growth of plants. Have them record growth by careful measurement (U.S. or metric) by a different team (2 or 3 children) daily.
d. Discussion:

1) Ask children to explain the difference in plant growth for each circumstance.

2) Ask them why plants grow better in humid equatorial areas than in the polar regions.

2. How green plants are the basis of our food supply. As the plant growth activity is being monitored, introduce this class activity:

a. Provide each child with a convenient form, and direct them to list some of the main foods they have for breakfast, lunch, and dinner. Tell them to avoid duplication, such as milk or bread.
b. Compile a non-duplicating list of these foods on the chalkboard.
c. Discuss the origin of each listed food item. Example:
eggs ⟶ chicken ⟶ grain, such as corn or oats ⟶ sun
Wheaties ⟶ grain, wheat ⟶ sun
meat loaf ⟶ cattle ⟶ grain, corn, grass or hay ⟶ sun
d. Have them use arrows to secondary source (chicken, etc.) if any, or directly through to primary source that is identified and listed.
e. Children should be able to conclude that all foods they have listed originate with green plants. (Some synthetic foods or vitamins have other possible origins, but are not normal diet.)
f. Discuss the global connection: current world production of wheat is about 415 million tons; corn, 340 million tons; and rice, about 350 million tons. Over half of the people in the world, mostly in China, Japan, and southeast Asia, depend on rice; why does the other half of the world's population consume so much more wheat and corn? Answer: rice is for primary consumption; wheat and corn are also directly consumed, but much is also fed to livestock from which we derive milk, eggs, and meat. (There is a significant energy loss because then people are secondary consumers.)

3. How fossil fuel such as coal, oil, and natural gas are an energy product of the sun because they have their origin from green plants.

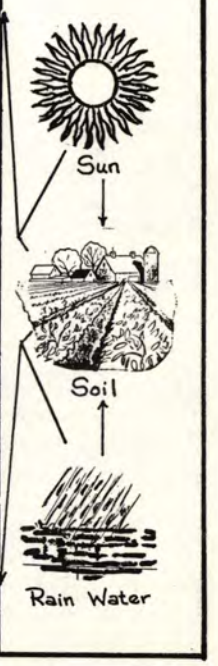
a. Read and discuss with the children this simplified explanation: We saw earlier that sun energy, through photosynthesis, makes and stores carbohydrates in plants, and that many animals eat plants. Dead plants and animals buried under soil and rock for thousands, even millions of years, by earthquakes, volcanoes, and other natural disasters, turn into coal, oil, and natural gas. Some of these deposits of coal, oil, and natural gas are near the earth's surface, others are thousands of feet deep. When and where discovered, such deposits are brought to the surface by mining and drilling wells. With these fuels we heat our homes, generate electricity, manufacture gasoline, and make many other products, such as plastics, chemicals, etc.
b. To illustrate the story of coal, oil, and natural gas, use an art and writing activity. Have all children write their own version of how we get coal, oil, and natural gas. Display completed picture and story.
c. Discuss with children:

1) That the United States does not produce sufficient oil to meet our needs.

2) That we import (buy) oil from such countries as Saudi Arabia in the Middle East, and Venezuela in South America. Use a globe to show children such locations.
d. Much of the coal, oil, and natural gas is used to generate electricity. Electricity does many things for us. Conduct an energy survey (use of electricity) in the school. Start with your classroom, then take a walk to check on use of electricity in the office, library or media center, and the cafeteria. In each situation, have them write the name of the item that uses electric energy.

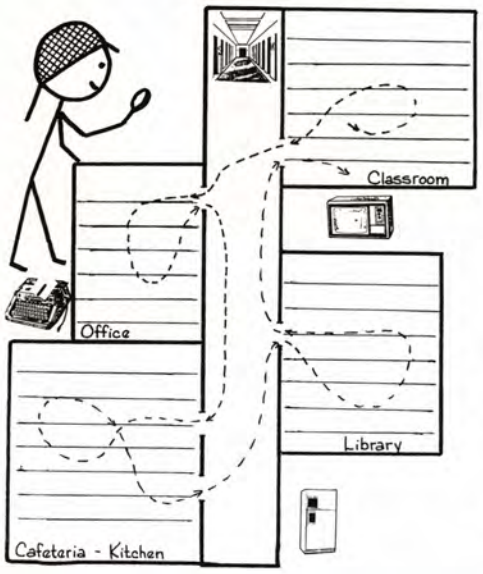
How I Depend On Plants For Food Name _____

	What I Eat	Where It Comes From	Kind of Plant	Makes Plants Grow
Breakfast				
Lunch				
Dinner				



Name _____

LOOKING FOR CLUES...
to electric energy use in our school



Make the point of how *dependent* we are on electricity and discuss what we could do to conserve electricity and reduce our dependence on oil, coal, and natural gas.

4. Administer this test to check on student achievement of the objective.

Name _____

Performance Check-Test for Sun + Plants = Energy

For each statement circle the words listed that would best complete the sentence.

1. Besides soil, all plants need _____ and _____ to grow.
   a. animals b. sunlight c. people d. water

2. The way in which the sun acts in green plants to make starch sugar (carbohydrate) is called _____.
   a. erosion b. fertilizer c. photosynthesis d. growth

3. Because of weather and soil conditions, plants grow best in areas near the _____.
   a. North Pole b. Equator c. South Pole d. Arctic Ocean

4. The main source of all foods that people eat first come from _____.
   a. green plants b. animals c. stores d. oceans

5. You had a steak for dinner; circle the things necessary to complete the food chain.
   a. swine b. beef cattle c. corn d. sun

6. People in China, Japan, India, and other Asian countries live mostly by eating _____.
   a. hamburger b. rice c. wheat d. cornflakes

7. When a person eats bread made from wheat, that person is a _____.
   a. primary consumer b. secondary consumer

8. _____ and _____ that are buried for a long time in the earth become coal, oil, and natural gas.
   a. plants b. rocks c. animals d. buildings

9. Countries like Saudi Arabia and Venezuela are important to the United States because we _____.
   a. import (buy) oil from them
   b. export (sell) oil to them

10. There are many things in our school that need _____ in order to work.
    a. animals b. electricity c. lights d. rain

RECOMMENDATIONS FOR EE IN THE UNITED STATES
– Based on a National Needs Assessment –

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As participants in the First National Congress for Environmental Education Futures, our purpose is to structure a major policy statement which will shape the future of environmental education (EE) in the United States. Alarmed by threats to biospheric integrity and convinced of the need for the development of environmentally responsible citizens (i.e., environmentally literate decision-makers) who can understand and react constructively to those threats, we will formulate a national plan of action for EE over the next five years. In essence, we will make recommendations for achieving widespread environmental literacy in the United States through EE.

The Goal—Environmental Literacy

The development of an environmentally literate citizenry has been advocated by a number of environmental educators in the U.S., and the characteristics of such a citizenry were exemplified in the objectives endorsed by the delegates to the international Tbilisi conference in 1977.

As recommended by the Tbilisi delegates, objectives necessary for attaining the literacy goal include the development of an *awareness* of and sensitivity to the environment and its problems, a *knowledge* of the environment and its problems, attitudes of *concern* for the environment and motivation for participation in environmental improvement/protection, *skills* requisite to identifying and resolving environmental problems, and *participation* in environmental problem solving.

Similar literacy components are included or implied in G. D. Harvey's description of the superordinate goal of EE. According to Harvey, that goal is

> to aid citizens in becoming environmentally knowledgeable and, above all, skilled and dedicated citizens who are willing to work, individually and collectively toward achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment. (p. 1).

Building on Harvey's work, Hungerford, Peyton, and Wilke (1980) have developed a set of curriculum goals which focused on environmental literacy. The Goals for Curriculum Development in EE (Hungerford, *et al.*, 1980) identified four levels of environmental literacy and included subgoals within each level. Those four goal levels are described below.

Level I: Ecological Foundations Level

This level seeks to provide the learner with sufficient ecological foundations knowledge to permit him/her to eventually make ecologically sound decisions with respect to environmental issues.

Level II: Conceptual Awareness Level, Issues and Values

This level seeks to guide the development of a conceptual awareness of how individual and collective actions may influence the relationship between quality of life and quality of the environment, and also, how these actions result in environmental issues which must be resolved through investigation, evaluation, values clarification, decision making, and finally, citizenship action.

Level III: Investigation and Evaluation Level

This level provides for the development of [and the opportunities to apply] the knowledge and skills necessary to permit learners to investigate environmental issues and evaluate alternative solutions for remediating these issues. Similarly, values are clarified with respect to these issues and alternative solutions.

Level IV: Environmental Action Skills Level—Training and Application

This level seeks to guide the development of [and provides opportunities to apply] those skills necessary for learners to take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between quality of life and the quality of the environment.

In an effort to assess the content validity of their goals, Hungerford and his associates analyzed each goal and subgoal, and identified where an interface existed between it and the five statements of Tbilisi objectives. The EE curriculum goals and subgoals were also submitted to a panel of five nationally recognized environmental educators and revisions were made according to their comments. Subsequent to the two validity assessments, the Goals for Curriculum Development in EE were judged to be a valid, syntactically sound, suitable framework for use in guiding curriculum development in EE.

Since these goals translated Harvey's work into manageable instructional goals and corresponded with the internationally recognized Tbilisi objectives, it appears useful to regard the Goals for curriculum development in EE as an operationalization of environmental literacy. As such, these goals describe the superordinate and attendant goals of EE and address the desired oucome of EE.

The EE Needs Assessment

Prior to making solid recommendations on how best to achieve the desired outcome, or goal, of environmental literacy on a widespread basis in the U.S., it would seem advisable, indeed necessary, to determine specific needs within the field of EE. This paper reports the findings of a recent study (Volk, 1983) which, in part, researched the status of EE in higher education as it relates to 1) the importance of EE literacy goals, 2) the accomplishment of those goals in existing EE curricula, 3) the need for goal-oriented curricula, 4) the anticipated use of those curricula, and 5) the need for inservice teacher education regarding goal-oriented curricula. Since many of the individuals active in EE at the higher education levels are also involved in K-12 teacher education, this paper will also report research finding relative to the status of K-12 EE and each of the above five variables. Hopefully, with this information as baseline data, the recommendations which result from the Congress might be accurate, realistic, and appropriate to the achievement of the overriding goal of EE—environmental literacy.

The research study which generated these findings surveyed professional environmental educators by mail regarding their perceptions of the aforementioned variables at each of four educational levels: elementary, middle school/junior high, secondary, and college/university. The study utilized 15 goal statements (See Table 1) which reflected four levels of environmental literacy: ecological foundations, awareness of issues and human values, investigation and evaluation of issues and solutions, and citizenship action. Those goal statements were adapted from the Goals for Curriculum Development in EE (Hungerford, *et al.*, 1980).

The memberships of two professional organizations, CEA and NAEE, were identified as the desired population for this study, and a 20 percent random sample (n = 169) was drawn from their combined rosters. Ninety-nine (58.6%) of the individuals who

TABLE 1

Environmental Education Goal Levels and Associated Goal Statements

Adapted from Goals for Curriculum Development in Environmental Education (Hungerford, Peyton & Wilke, 1980)

LEVEL I: ECOLOGICAL FOUNDATIONS...The *Knowledge* of Key Concepts and Allied Ecological Principles.

1. Students *gain sufficient knowledge* of ecology to permit them to make ecologically sound decisions with respect to both humans and the environment.

LEVEL II: THE AWARENESS OF ISSUES AND HUMAN VALUES...The *Knowledge* of How Human Activities May Influence the Relationship Between Quality of Life and Quality of the Environment.

2. Students *gain an understanding* of the ways in which human cultural activities (economics, religion, politics, social customs, etc.) influence the environment.
3. Students *gain an understanding* of the ways in which individual human behaviors impact on the environment.
4. Students *gain an understanding* of a wide variety of environmental issues and both the ecological and cultural implications of these issues.
5. Students *gain an understanding* of the various alternative solutions for solving (or partially solving) particular environmental issues. The ecological and cultural implications of these solutions are considered.
6. Students *gain an understanding* of the roles played by differing human values in environmental issues.

LEVEL III: THE INVESTIGATION AND EVALUATION OF ISSUES AND SOLUTIONS...The *Development of Skills* Necessary for the Actual Investigation and Evaluation of Environmental Issues and of the Alternative Solutions to Those Issues.

7. Students *develop those skills* which will enable them to identify and investigate environmental issues using both primary and secondary sources of information.
8. Students *develop those skills* which will enable them to analyze environmental issues and the associated value perspectives with respect to their ecological and cultural implications.
9. Students *develop those skills* which will enable them to identify alternative solutions for particular issues and to evaluate those solutions with regard to their cultural and ecological implications.
10. Students *develop those skills* which will enable them to identify and evaluate their own value positions related to particular issues and to the solutions proposed for those issues.
11. Students *are provided with opportunities to apply skills* in investigating and evaluating environmental issues and solutions.
12. Students *are provided with opportunities to participate* in the valuing process in order to examine their own values with respect to both quality of life and quality of the environment.

LEVEL IV: CITIZENSHIP ACTION...The *Development of Those Skills* Necessary for Students to Take Appropriate Environmental Action

13. Students *develop those citizenship skills* which will enable them to make either individual or group action (i.e., persuasion, consumerism, political action, legal action, ecomanagement) where such action is appropriate for the purpose of solving, or assisting to solve, particular environmental issues.
14. Students *are provided with opportunities to apply citizenship skills* in making decisions concerning appropriate environmental action strategies to be used with respect to particular environmental issues.
15. Students *are provided with opportunities to take citizenship action* on one or more environmental issues.

were surveyed returned usable responses, and twenty (11.9%) incomplete or otherwise nonusable survey instruments were returned.

Geographically, the usable responses were widely distributed with 29 states and the District of Columbia represented. Fourteen percent of the responses were from the western United States, 18% from the eastern U.S., 18% from the South, and 50% from the Midwest. Males comprised 66% of the sample and females 34%. Respondents ranged in age from 18 to 79 years (X = 42 years), and had been active in the field for 1 to 35 years (X = 12 years). Fifty-two percent of the responding individuals reported a major focus on formal EE, while 30% indicated a non-formal EE emphasis.

It bears reporting that the study assessed the perceptions of professional environmenal educators concerning goal importance, goal accomplishment, need for goal-oriented curricula, anticipated use of said curricula, and need for teacher education relative to goal-oriented curricula. These individuals, however, were selected under the assumption that they were professionally involved with EE and familiar with the goals and curricula of the field. Thus, their perceptions should reflect an accurate picture of EE with respect to the goals in question.

What were those professional perceptions regarding EE? A number of the research findings are presented and discussed below.

FINDING:

The EE goals are considered important at each academic level, and increase in importance at each succeeding level (See Figure 1).

Although the EE goals are considered quite important at all academic levels and increase in importance with succeeding academic levels, their perceived importance remains relatively static across goal levels. That is, at a given academic level, there is no appreciable increase in perceived importance of the higher level goals in relation to the lower level goals. In fact, at most academic levels there is a slight decrease in importance for the citizenship action goals. This decrease is somewhat distressing given the posture among leading environmental educators that the higher goal level (i.e., citizenship action) is the major outcome upon which EE efforts are, or should be, focused.

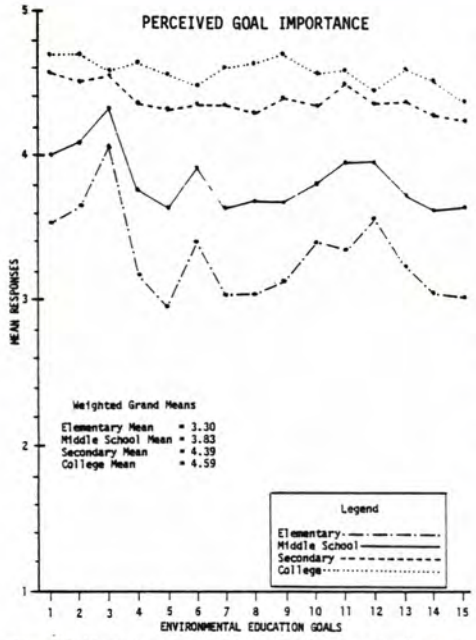

Figure 1. Mean responses pertaining to the perceived extent of importance of discrete goals at each academic level (where 1 = to no extent, 3 = to a moderate extent, and 5 = to a complete extent).

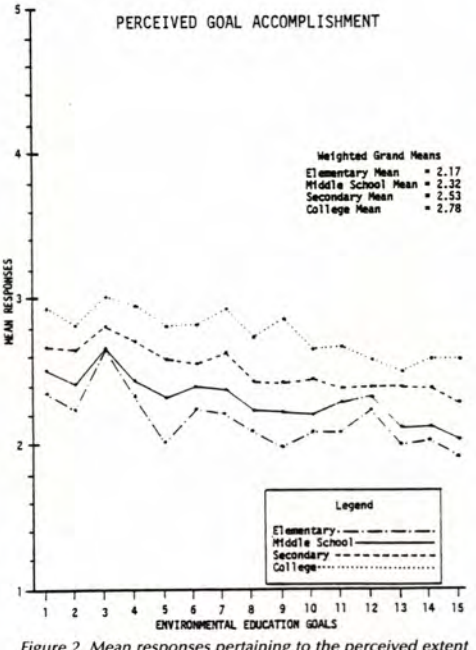

Figure 2. Mean responses pertaining to the perceived extent of accomplishment of discrete goals in existing curricula at each academic level (where 1 = to no extent, 3 = to a moderate extent, and 5 = to a complete extent).

FINDING:

In general, professional environmental educators believe that the goals for EE are not being accomplished with existing curricula (See Figure 2). Although perceived accomplishment of the goals increases somewhat across the academic levels, it rarely exceeds the moderate extent of accomplishment at any level. There is a somewhat greater degree of accomplishment relative to the lower level goals (ecological foundations knowledge, and awareness of issues and human values) than there is relative to the higher level goals (investigation/evaluation of issues and solutions, and citizenship action.)

In the perceptions of professional environmental educators, the goals for EE are not being met with existing curricula. This strongly implies that EE is failing in its endeavor to develop knowledgeable, concerned, competent, and participating citizens, i.e., environmentally literate human beings.

Although the overall accomplishment of EE goals is minimal, the lower level goals (knowledge and awareness) appear to enjoy an advantage over the higher level goals (invesigation/evaluation and participation) in terms of perceived accomplishment. These findings are not surprising in light of an earlier study (Childress, 1978), in which goals addressing issue investigation and evaluation, and participation in problem solving were found to be relatively scarce within existing EE programs and projects.

These results may suggest a relationship between the absence of an increase in perceived importance with succeeding goal levels and the increasing failure to meet the investigation/evaluation and citizenship action level goals. It appears that, by and large, environmental educators continue to act on the belief that citizenship action can be brought about through a focus on environmental knowledge and awareness, although a growing body of research (Horsely, 1977; Klingler, 1980; Ramsey, Hungerford, & Tomera, 1981) indicates otherwise.

FINDING:

At each academic level, the perceived importance of the goals exceeds their accomplishment. The difference between these two variables increases at each succeeding level (See Figure 3).

In the perceptions of the environmental educators surveyed in the study, there is a considerable discrepancy between the desired state of EE (measured by the importance question) and the existing status of EE (determined by the accomplishment question). This discrepancy appears to become more pronounced as an individual moves upward through his or her educational experiences, i.e., elementary through college level education. The results of this study, therefore, would imply definite needs within EE in the United States at all academic levels.

FINDING:

There appears to be a substantial need for goal-oriented curricula at each academic level (See Figure 4). The greatest need is observed at the secondary level, followed in turn by the college, middle school, and elementary levels.

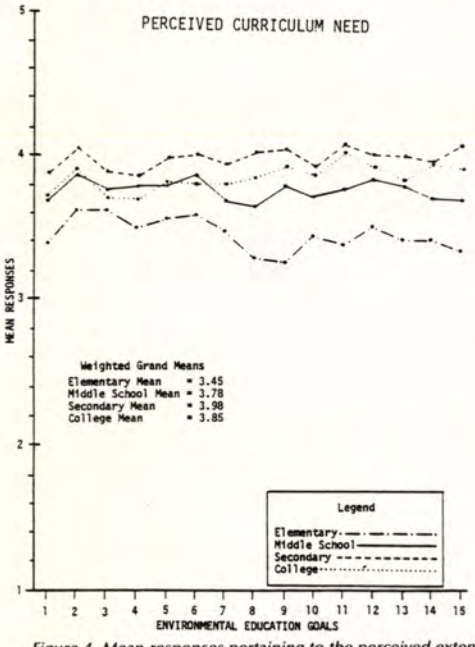

Figure 4. Mean responses pertaining to the perceived extent of need for curricula addressing discrete goals at each academic level (where 1 = to no extent, 3 = to a moderate extent, and 5 =to a complete extent).

FINDING:

The need for inservice teacher education is perceived to be a major need at each academic level (See Figure 5). The greatest need is observed at the secondary level, followed in turn by the middle school, elementary, and college levels.

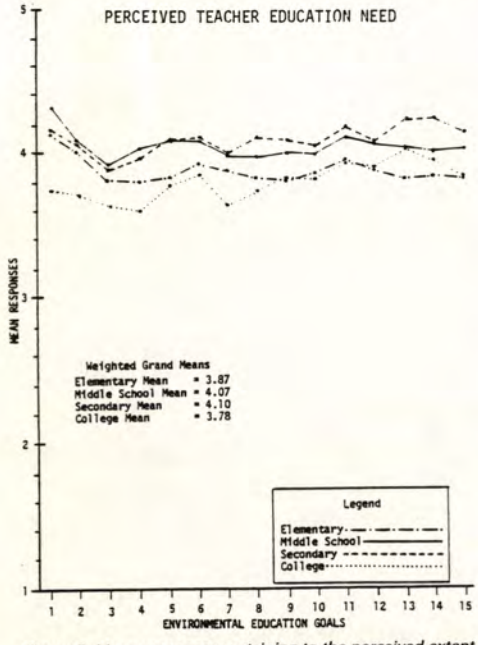

Figure 5. Mean responses pertaining to the perceived extent of need for inservice teacher education for curricula addressing discrete goals at each academic level (where 1 = to no extent, 3 = to a moderate extent, and 5 = to a complete extent).

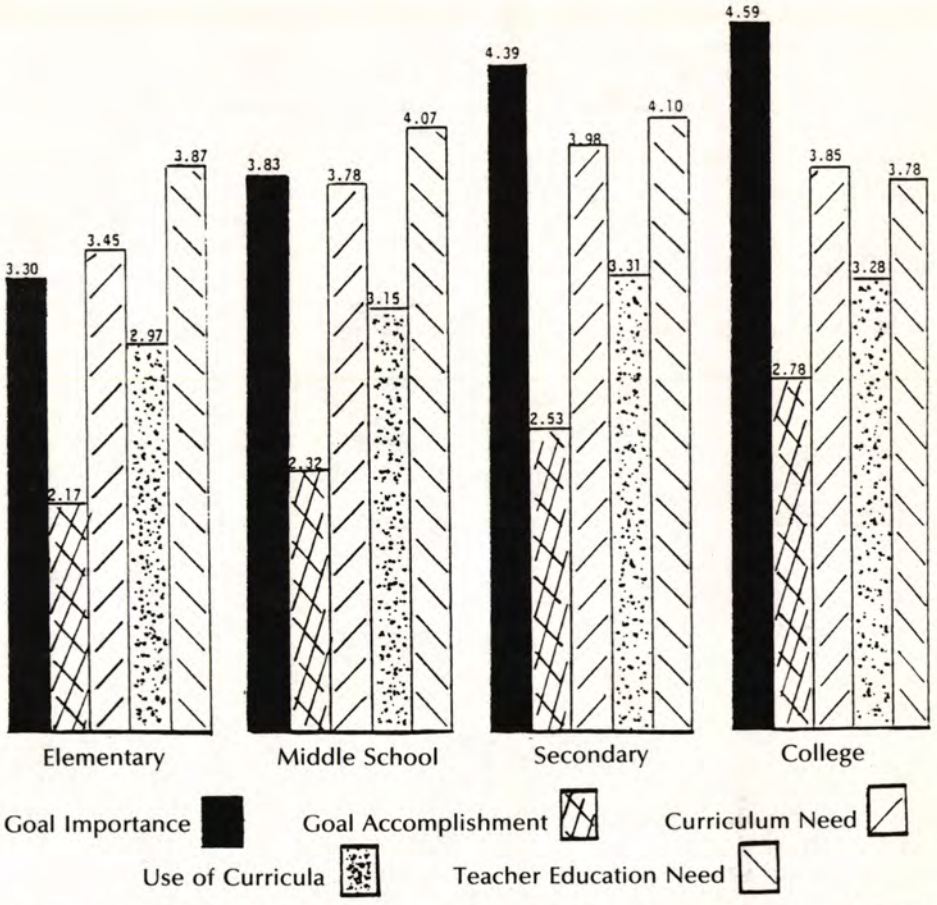

Figure 3. Weighted (in terms of the number of subjects responding to each item) grand means of the responses to each of the five major needs assessment questions portrayed at each of four academic levels (where means of 2.0 = to a very little extent, 3.0 = to a moderate extent, 4.0 = to a considerable extent, and 5.0 = to a complete extent).

The results of this study provide a convincing argument for increasing efforts in teacher education and curriculum development in the field of EE. Curricular and teacher education needs are perceived as present at all academic levels and appropriate to all of the goals for EE. Although both curricular need and teacher education need were observed to differ across academic level, those differences were slight, leading one to infer substantially high needs at all academic levels.

FINDING:

Professional environmental educators anticipate that classroom teachers would use new curricula to a moderate extent or better (See Figure 6).

Professional environmental educators believe that goal-oriented curricula would be used by classroom

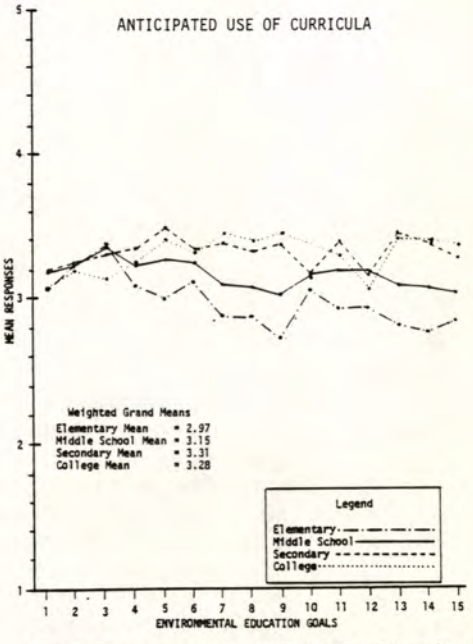

Figure 6. Mean responses pertaining to the anticipated use of curricula addressing discrete goals by classroom teachers at each academic level (where 1 = to no extent, 3 = to a moderate extent, and 5 = to a complete extent).

teachers, although the extent of use of said curricula relative to discrete goals would be quite varied. Since previous reseach has indicated that available curricula and teacher training are both factors in a teacher's use of EE materials (Johnson, 1980), it appears appropriate to suggest that if classroom teachers were provided with goal-oriented curricula and with the in-service teacher education which would permit them to utilize the curricula, their use of said curricula could be increased.

FINDING:

No substantial differences existed between formal and non-formal environmental educations regarding the above perceptions.

The way in which the sample was obtained evoked responses from a variety of professional environmental educators. Included within the sample were educators with a focus on formal EE as well as those who work in the nonformal arena. Since no significant differences were evidenced between the responses of those two groups of educators, it might be inferred that professional environmental educators, regardless of their foci, are in general agreement regarding the variables assessed in the study.

In general, then, the results of the study reveal a consensus among professional participants that the EE goals are important ones, that they are not being met to a large extent in existing curricula, that extensive needs exist for both goal-oriented curricula and teacher education, and that the goal-oriented curricula would gain use from practitioners. If those perceptions do, in fact, provide us with a description of needs in EE, and if our goal is widespread environmental literacy, then it appears that those needs must be met in order to achieve our goal. The following recommendations are offered as suggestions for giving structure to that task and, hopefully, reducing its enormity.

RECOMMENDATION ONE:

One of the recommendations made by the 1978 Leadership Conference was that "the Tbilisi goals and objectives of environmental education should be further clarified for use by teachers" (Stapp, 1978, p. 71). The set of EE goals which provided the framework for the present study—the Goals for Curriculum Development in Environmental Education—translated the general Tbilisi objectives into definitive curricular goals and, in essence, clarified and operationalized those objectives. Further, correspondence between the Tbilisi objectives and the Curriculum Goals has been validated by a jury of nationally recognized environmental educators. Additionally, there appears to be a consensus among the professional environmental educators (both formal and non-formal) who participated in this study, that these EE goals are important throughout an individual's education.

Therefore, it is recommended that this Congress endorse the Goals for Curriculum Development in EE as national goals in EE, and encourage the utilization of these goals in all appropriate phases of EE. Such a set of national goals might provide cohesion within the field of EE and therefore serve as a vehicle toward providing the direction for a coordinated thrust for environmental education within the United States.

RECOMMENDATION TWO:

There is an immediate and critical need for the development of new curricula which address the goals for EE. This need is extant at all academic levels (elementary, middle school/junior high, secondary, and college/university) and for all the goal levels (ecological foundations knowledge, awareness of issues and human values, investigation/evaluation of issues and solutions, and citizenship action). It is, therefore, recommended that goal-oriented curriculum development be undertaken. Those efforts should focus on the development of curricula which address all four of the goal levels, and which develop knowledge and proficiencies across those four levels in a hierarchical manner which is well articulated and educationally

(continued on page 42)

ENVIRONMENTAL EDUCATION: Linking Modern Strategies With Ancient Traditions

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SYNOPSIS

Designing effective educational strategies for assisting people to live in harmony with nature is of paramount importance today to prevent destruction of the biosphere and preserve natural areas and wildlife populations. While there is a world-wide trend toward the westernization of culture with a strong emphasis upon science, technology, and cash economies, many people in various parts of the world still continue to live according to ancient traditions of pre-scientific origins. Many others now undergoing economic development desire some of the benefits of modern science and technology but wish to retain their cultural heritage, values, and lifestyles as much as possible.

It is suggested that environmental education to be most effective must be consistent with cultural values as well as their translations into environmental perceptions. Developing a global perspective as well as an awareness of modern environmental problems requires understanding of scientific concepts yet it is argued that in traditional societies these kinds of information are best learned through an educational process more in keeping with cultural styles which have evolved through many centuries. It is further argued that many of the traditional methods of environmental education, especially the use of ceremony and ritual, folk tales, singing, and dancing may have universal value to environmental education. Examples of programs developed along these lines will be given from several different cultures in the International issue of *Nature Study,* which will be published in 1984. Suggestions about creating programs based upon traditional societies for people from other cultures will be included, as well as suggestions about methods for developing programs in other cultures choosing to retain their unique cultural heritages. □

TAKE IT OR LEAVE IT:
Mini-Scale Selective Cutting as an Educational Tool

John W. Brainerd
Professor Emeritus, West Brooksville, Maine

On-site clarification and obfuscation regarding present actions and their probable future results when incising nature with pen knife or chain saw, meeting outdoors in a little woodland or shrubland for arguing about what to cut and what not to cut. Lawyers and poets welcome and all others with facts and feelings and a sense of fair play toward other people and our shared environments on Planet Earth.

SUMMARY

The UVM campus provided *no little woodland or shrubland* within walking distance; all was parking lots, roads, and paths, ornamental shrubs, a few trees, and acres and acres of lawns. These consummated landscape architects' dreams of a superb setting for education on a Vermont hilltop. The outlook was superb. The scene, however, at first glance, did not appear conducive to even mini-scale selective cutting!

We started by contemplating a sickly little conifer planted lonesomely in the lawn. Some landscape designer had hoped it would become a "specimen tree," a scenic feature standing by itself, either with near-perfect symmetry or possibly a hilltopian windblown picturesqueness. Unfortunately it had been badly vandalized (like much of Planet Earth). Its broken form reminded me of a partially run-over dog which perhaps should be put out of its misery. We discussed pros and cons of cutting it down, ending its wretched struggles. Rationalizing that some student might be learning from the little tree's uphill battle, we decided to let it live as best it could.

Nearby a sandy patch in the extensive greensward had evidently provided an outlet for the creative landscaping efforts of children who might otherwise have been bored by the monocultured lawn. Mini-hills and valleys sported roads and bridges for imaginary midgets. We pooled our thoughts about sand piles and children. (How pathetically little space adults provide for children to do *their* things.)

Next we carefully crossed a busy road to a parking lot where we could trace the gravelly-sandy courses of the intermittent mini-streams of the most recent rain. Today in the hot August sun, the parking lot made a wonderful desert exemplifying the environment of our Amerindian brothers and sisters in New Mexico and Arizona, African confreres of the Kalahari, and Australian aborigines, all fellow humans desperately struggling to defend their water-rights. We did not recommend cutting into the paving to let runoff water become insoak water replenishing groundwater supplies—but we might have.

The far edge of the paved desert was bounded by an earthen berm some eighteen inches high. We named it Pigweed Ridge because of its predominant vegetation but noted many other little volunteer plants contributing the often-unappreciated beauty of groundsmen's neglect. Naming overlooked areas or those suffering from inattention will often focus positive attention on them. Such often can become valued natural areas or better-cared-for unnatural ones.

Another parking lot, a gravelly one just beyond Pigweed Ridge, boasted puddles whose precipitative-evaporative tides of rainfall and sunfall had left zones of colored sands and muds; these brought to our minds earth paintings of Navajos as well as the physical and social problems of hydrologists. Serendipity: two deserts for study side by side – and these with an impatient killdeer in the offing.

Next we walked barefoot across the Kentucky Bluegrass, Fescue, Redtop, or whatever, then lay back-to-lawn and face-to-sky on a gentle slope for a bit of rest and release from my voice and for any inward feelings to be at ease with themselves. A red-tailed hawk left no contrails as it circled upward and onward into invisibility. I softly mentioned it but the relaxers may not have heard or noticed. No matter. There are times when a leader must respect silence as the greatest teacher. Cirrus clouds this hot summer day scratched their ice-crystal paths across the sky and spoke in their own silent way of planetary winds bringing air masses to heat or cool, moisten or dessicate, annoy or delight planetary passengers.

Our final stop found us sitting semicircled around a little shrub in the lawn a few yards away from a paved path. It had been unvisited by a groundsperson for some months, judging by the rich assortment of weeds close about it – and indeed within its sprawling branches. Here at last we had found a site for our "MINI-SCALE SELECTIVE CUTTING AS AN EDUCATIONAL TOOL." As we contemplated the remarkable design of this miniscule Garden of Eden, no 'lawyer' in our group argued for taking so much as one piece of grass from it. The longer we looked into it, complete with its insect fauna, the more of a paradise it seemed. No visible snake. No apple. No Eve to originate evil. This little, offbeat, weedy patch needed neither chain saw nor pen knife to reveal its perfection. Perhaps some day one of us may write a poem – or better still a paean – about that round patch of nature living joyfully in benign neglect.

At 4 o'clock I dismissed my little group, leaving them to disband as they wished, and strolled back to my camper. About an hour later I chanced to pass by on the paved path and saw them still sitting there at the edge of Eden, those precious people who shared their afternoon with me. □

Adirondack Lake

I have come to try my luck,
snapping out the line in soft loops,
easing the fly back across the surface.
The lake is a room that is all glass.
The trout would be inhabitants of
another world,
except I don't see any.

Nothing has leaped at my lure.
No bullfrog has delivered a mighty
"jug-o-rum."
No green frog plucked a banjo.
No yellow throat scolded in the alder.

I haven't seen any tracks on the shore,
not of raccoon, not of fox, not of deer.

Maxwell Corydon Wheat, Jr.

PROJECT LEARNING TREE

Facilitators: Cheryl Charles, *Director, Project Learning Tree*
Jan Rensel, *Associate Director, Project Learning Tree*
John Herrington, *Regional Manager, American Forest Institute*
Bill Hammond, *Member of the Project Learning Tree Planning and Advisory Council*

Forest products, land use decision making, issues in resource management, patterns in nature, and learning styles. These and other topics were included in the diverse activities and emphasis of the Project Learning Tree practices session held at the First National Congress for Environmental Education Futures.

Project Learning Tree is an environmental education program designed for educators working with kindergarten through high school age young people. The program is co-sponsored at the national level by the Western Regional Environmental Education Council, a not-for-profit organization of the departments of education and resource management agencies in 13 western states; and the American Forest Institute, a not-for-profit information organization of the forest products industries.

Project Learning Tree offers instructional materials and services in each of 33 states where the project is presently available. The *Project Learning Tree Supplementary Activity Guide for Grades K through 6* and *Grades 7 through 12* is made available free-of-charge to those attending Project Learning Tree workshops. At the time of the National Congress, more than 60,000 educators had participated in Project Learning Tree workshops. The project's research indicates that well over 2,000,000 students experience PLT instructional activities during each school year.

The Project Learning Tree practices session at the National Congress was designed to serve as an introduction to PLT for those not familiar with the program, and an update for those who know and use the program's resources.

Following are a few sample activities from the Project Learning Tree Supplementary Activity Guides which were included in this practices session. For additional information about the program's availability, please contact: Project Learning Tree, in care of the American Forest Institute, 1619 Massachusetts Avenue N.W., Washington, D.C., 20036; attention June McSwain, Education Director.

Long Range–Short Range

SUBJECTS:
Social Studies, Science
GRADES
K-3
PLT PRINCIPLES*:
4. Societal Perspectives on Issues
5. Management and Interdependence of Natural Resources
CONCEPTS:
4.33 Necessity for Long-Range Planning
5.21 Plants as Renewable Resources
SKILLS:
IV. Critical Thinking
I. Gaining Information

OBJECTIVE

Students will be able to describe the long-range effects resulting from an action.

ACTIVITY

Post the following situation to your students:

We have six fully grown trees on our land. We have no other trees around our house or anywhere else on our land. We need firewood and are trying to decide whether to cut all the trees down during next winter to use them for firewood.

Given the information, try to decide what seems to be the best action to take.

Consider: What will happen next summer when it gets hot? (No shade.)

What might happen the following winter when more firewood is needed to keep warm? (No fuel for cooking and heating).

What problems might there be for animals? (Fewer places for some birds and squirrels to live.)

What might a person do to be sure that there are trees left for the future? (For example, each time a tree is cut two could be planted.)

Through discussion, emphasize to the students the differences between short-term and long-term results of actions they recommend. Ask the students to describe the long-range effects of any action they recommend.

*These Project Learning Tree Principles are available from the American Forest Institute.

Vacation Homes

SUBJECTS:
Social Studies
GRADES
4-6
PLT PRINCIPLES
4. Societal Perspectives on Issues
7. Lifestyles
CONCEPTS
4.41 Respect for Preferences of Others
4.1 Self-Role Perception
4.4 Variety in Use
7.2 Cultural Effects on Resources
SKILLS
III. Social Participation
V. Problem Solving
VI. Valuing

OBJECTIVE

Students will learn how group decisions affecting private citizens and the public are made, through participation in a land-use simulation.

ACTIVITY

Prepare a scenario describing a hypothetical situation for distribution to students:

There are 50 summer cabins on Lincoln National Forest land along Bear Creek. The sites for these cabins were leased to private citizens 30 years ago. At that time there was very little forest recreation in this area.

Since then, the nearest city has grown tenfold. Recreation in the Bear Creek area is almost 20 times what it was 30 years ago.

Some people feel that those 50 cabins should no longer be permitted to dominate that area of Bear Creek and that the land belongs to all of the people.

Should 50 families have Bear Creek to themselves or should their leases be terminated and the cabins removed? Should the cabin owners be allowed to remove the cabins? Should they be reimbursed for their value?

Divide the class into these three groups:

1. Three or four members to represent the Forest Service Advisory Board. They will conduct a hearing and arrive at a decision.

2. Half of the remainder of the class will role-play the cabin owners.

3. The other half of the remaining students will represent the general public.

Allow the "cabin owners" and "general public" time to prepare testimony stating their reasons for either renewing the leases or abolishing them. During this period the U.S. Forest Service Advisory Board should plan the hearing procedures, specifying who testifies, for how long, and in what order.

When all groups feel they are ready, the hearing should be convened. After the testimony has been presented and opportunity for rebuttal provided, the Advisory Board should meet briefly to reach a decision. They should then return and report their decision to the entire class, explaining the reasons for their decision.

Following this simulation, discuss with the student the means by which such land-use decisions are made in your local region.

Note: It is useful to have the classroom arranged as a hearing room for the meeting or to find an available auditorium.

Why Wooden Pencils?

SUBJECTS
- Social Studies, Science, Language Arts and Humanities

GRADES
- 4-6

PLT PRINCIPLES
- 5. Management and Interdependence of Natural Resources
- 7. Lifestyles

CONCEPTS
- 5.21 Plants as Renewable Resources
- 5.25 Reuse of Nonrenewable Resources
- 7.32 Conservation Through Product Design

SKILLS
- I. Gaining Information
- II. Communication
- IV. Critical Thinking

OBJECTIVE

Students will be able to describe the suitability of certain materials for the manufacture of a particular consumer product.

ACTIVITY

Distribute papers with these headings to your students: wood, plastic, steel, aluminum, copper, iron.

Divide your class into six groups. Ask each group to compile a list of products used in the school which are made from each of the materials named. Once completed, ask all the groups to share their lists. Through discussion—and possibly after out-of-class investigation to verify the derivation of some materials—create a master list.

When the master list is complete, ask each student to pick any three products, each made of a different material (for instance, a pencil, a metal locker, and a plastic table) and write a brief explanation of the possible reasons each product was made from one material rather than another. In other words, why are most pencils made of wood rather than steel or plastic? What properties do these materials have which lend themselves to particular uses and not to others? Which materials are derived from renewable resources? Identify the others as being derived from nonrenewable resources. Note that some products are made using both renewable and nonrenewable resources. Which products are reusable? Which are recyclable? Ask the students to offer their opinions, based on the study they have done, of the appropriateness and suitability of the materials used to make each of the products.

Cheryl Charles and Bill Hammond during the Project Learning Tree Practitioners Session.

Photo by Ray Pfortner

Biography of a Favorite Thing

SUBJECTS:
- Science, Social Studies, Mathematics

GRADES:
- 7-12

PLT PRINCIPLES:
- 7. Lifestyles
- 2. Diversity of Forest Roles
- 6. Life-Support Systems
- 5. Management and Interdependence of Natural Resources

CONCEPTS:
- 7.123 Behavior Effects on Environment
- 7.32 Conservation Through Product Design
- 6.1 Dynamic Biological Systems
- 5.5 Trade-offs
- 2.11 Need for Forest Products
- 2.242 Forest-Dependent Leisure-Time Activities

SKILLS
- I. Gaining Information
- II.Communication
- IV. Critical Thinking

OBJECTIVE

Students will be able to identify ways they depend on natural resources in their daily lives.

ACTIVITY

Ask students to pick out a favorite object in their life which is a forest product; for example, surfboard, skateboard, wall-poster, kite, clogs, book.

(continued on page 37)

SUCCESSFUL FIELD TRIPS

Richard B. Fischer
Professor of Environmental Education, Cornell University

Why Not More Field Trips?

At Cornell I usually begin a lecture on this subject by posing the question: Why bother to have field trips? You *know* why, and you have led them yourselves; presumably you came here for some suggestions that could make your trips more effective. Since field trips are such a great idea, since they make learning active and the learner internalizes facts and concepts, why are there not more field trips? Various reasons, some of which are valid, crop up. Many teachers use as an excuse, "Oh, there's no good place available." I almost fell into agreement with them when I came here yesterday afternoon because I knew what I wanted to use by way of outdoor materials. They are going to be trees. As I looked around on this Vermont campus for some of the trees that I always feel at home with, it began to appear that I would have real trouble pulling my demonstration field trip off. Trees are there but there aren't many kinds, and they don't seem to be what I want. Maybe I should cancel the field trip, I thought. Well, that would have been a handy but dishonest excuse. It is one that many teachers, however, fall back on.

Sometimes it isn't possible to have a field trip simply because the principal of the school says, "Nobody goes outside around the school building." Maybe there was a legal problem at one time and the school principal is now unwilling to risk another lawsuit. The school board may have been involved in some sort of altercation and has said to the principal and the superintendent, "No field trips around this school." Most school administrators insist that school field trips be led by persons who have signed forms from the parents that protect the schools from insurance problems.

Class Discipline Outdoors

A much more reasonable excuse, it seems to me, is that the teacher might not feel as though she has enough of a hold on the students. Once you go outside there are no more walls. And as some of the professors at Cornell say, there's no more demonstration table to stand behind to have at least some sort of barrier between you and the students! It's risky going out there with all those kids. There are no seats to anchor them. Presumably you know their names so the anonymity ogre doesn't creep up. To those of you who are just beginning your classroom teaching careers, don't attempt an outside field trip unless you have good control over the classroom situation. Otherwise it could be worse than a disaster, worse for you than it would be for the kids. *They* would have a good time. A bad experience might prompt you to never again have field trips and that would be a great loss to the environmental cause.

"I Don't Know Enough"

Many persons say that they don't take students or others on field trips because they simply don't know enough. Pick a subject for which you do have a lot of answers. Don't needlessly expose yourself to "I don't know," "I don't know," "I don't know." After a while youngsters will reasonably wonder: "Doesn't our teacher know anything about natural history subjects?" You don't want *that* to happen. You *do* know a lot. But as I encounter the factual knowledge problem in my teaching at Cornell, and as you will encounter in your teaching, you are going to run up against persons who know more about a subject than you do. The older the learner, the more likely it is you will encounter the problem. Well, what are you doing to do? Throw up your hands? *Admit* that you don't know everything, but turn the situation around and make that person the instructor for the particular piece of information. Frequently the pupils who know more than you do are quiet, so you don't realize how much they know. Suddenly the student will ask a question or make a short statement that reveals right away that there's an awful lot going on up there in that little head. So put that person to work. And in doing so you will do something to that person. You will win that person over as a cooperator, but you will also begin to draw that person out. Many youngsters (and oldsters too) need to be drawn out. They never had much of a chance to be in the spotlight; you will be giving that student a feeling of worth and importance that person may never have had.

Schoolyard Field Trips

Now where is the trip going to take place? Is it going to be right around the school or is it going to be off to an environmental center? There's a kind of glamour, a kind of allure, an excitement, an anticipation in going off someplace. But very often it isn't going to be possible to go to a center. There might not be someplace nearby to go. There might not be travel money to go. There might not be permission to go off the school grounds; perhaps the only place you can do your field work is there on the school grounds. Do not be discouraged—there are many many advantages to confining your field trip to the area around the school. John Brainerd is not in the room, but if he were here I'm sure the first thing John would have said just then was "Amen." John has pushed schoolyard ecology and environmental study for many many years and has done it very successfully.

When your field trip takes place around the school you have no transportation problems. You just go out the door. You lose no time in traveling, which is precious teaching time. Even though you plan for things to do on the bus, if you use a bus, you can't use all of the time as you can right on the school grounds. If there's some reason to return to the school building quickly, it's a cinch. The reasons could be many; a sudden change in the weather, somebody could get ill, the class

might become so unruly for reasons beyond your control that the only intelligent thing to do is say: "Well, boys and girls, or ladies and gentlemen, it's obvious you are not interested in what *I'm* interested in doing out here, therefore, there's no point in our staying out here, so let's go back to the classroom." The moment you feel you need to do that, do it! If youngsters think they can have a lot of fun outside on the school yard when they are supposed to be learning something, and have the fun at your expense, they're going to do it. So call their bluff instantly.

If the field trip takes place on the school grounds the children can dress the way they normally dress. There's no problem with loading them up with boots and a lot of other things. They can repeat the field trip on their own very easily. They come to school 5 days a week, they can look at the things on the school grounds 5 more days a week as many times as they wish without having to go anywhere. The whole class can do follow-up studies of the things you look at on the school grounds. It isn't usually feasible for the whole class to go back to an environmental center for follow-up studies. I think it would be better to go to the environmental center for some other learning experience than to, in a sense, extend something you've already done. I would rather have the youngsters get a new exposure. And by taking your field trips around the school building, you can get the youngsters accustomed to going on field trips and learning what is expected of them.

Trips to Environmental Centers

The reason — a very important reason — for having environmental centers is that they can provide facilities and learning experiences that are simply not available on the school grounds. How many school grounds have a pond? How many have a stream running through them? How many have a woods coming right up to the edge with old logs and woodpecker holes and dead standing trees and raccoon dens? Not very many. So there may be very good reasons for going to an environmental center. That takes careful preparation in terms of getting the parents' permission, making sure the principal is informed, telling the class what you are going to do there, what the place is like, who operates it... Most importantly, make it crystal clear to the class that this isn't a trip to an environmental center as a reward for good behavior (the basis for so many class trips), the way we see so many trips taking place in June. It should be clear to the youngsters that this trip is an important part of what we are studying in our curriculum: social studies, language arts, biology, ecology, environmental studies, whatever.

Prepare the Learners

A great deal of precious teaching time can be utilized on the bus in prepping the students for the trip since their interests then are probably at a fever pitch. Back in the classroom, before the trip, you have prepared these learners both academically and personally. The question you want to leave with the pupils as they get off the bus is: What do we want to learn? As I said, this field trip is the logical outcome of what you have been studying in a particular curriculum. Therefore you have your learning objectives clearly in mind. They are objectives limited in number so that you can get everything done in the one visit. The understanding is that, when the class returns to the school room, there will be further discussion and there will be an extension of the learning that was accomplished there.

You prepare the learners academically, but you prepare them personally also. They should know how to dress. Should they wear long or short sleeves? Will there be mosquitoes there? (Long sleeves would be a good idea; perhaps you should take along repellant of some sort.) Of course they will need to carry something on which to take notes, because note taking should be part of the total learning experience. You'll also want to tell them about things not to bring, for youngsters can take the darnest things on field trips.

If the class is coming to you at a center and you will be their teacher there, then make sure that, in your arrangements with the teachers in advance, the youngsters have name tags on them. Now if you are a classroom teacher taking your class to the environmental center, then you are not going to write out the names of 29 or 30 youngsters on all these name tags. That's something they could do and they would probably enjoy doing it. So *they* make the name tags. If they want to make the name tags in a shape of an acorn, or a tulip tree leaf, or a white oak leaf or something else you've been studying—so much the better. But the name tags should be conspicuous and easily read because you know how a youngster can become a problem if that youngster can be anonymous. When you remove that mask of anonymity, the youngsters are much easier to manage. And of course the parents know where the youngsters are going and have given their consent. You know which of the youngsters have problems, problems such as an allergic reaction to bee stings, and you know that the person (or you) will have the correct medicine along on the field trip, just in case...

Prepare Yourself

In addition to preparing the youngsters, you need to prepare yourself. You need to know *where* and *what* the resources are around the school or the center you are going to visit so you can be sure that you will be able to teach the concepts, the facts, and the vocabulary and all the other things that you want to teach. That means close consultation with the people at the center, or it requires careful pre-trip examination on your part at the site to which you are going to take the class. Is there anything more exasperating than being unable to locate a particular tree or rock or hole in the ground that you saw when you were there alone yesterday? Solution: Mark your teaching stations with a small piece of yellow ribbon, white cloth, or index card. Assign a student to remove them as you proceed to the next stop.

Another benefit accrues when you go over the route of the field trip in advance: you discover spectacular *but irrelevant* items that the class is certain to wonder about. Teachable moments we call them. Now you can prepare yourself for those inevitable questions *before* they come crashing down on you on the class trip.

For that trip, select just a few concepts and their supporting facts, few enough to fit them into the available time easily. Choose specimens abundant enough so each student can see, touch and examine his or her own specimen. If there aren't enough specimens some of the youngsters will miss the lesson. Others might become troublesome because they're not part of anything anymore so they create their own "interest groups" and you know what *that* means.

Plan the Lesson

Your field notebook—which you refer to whenever you take a class on a trip just as you refer to the lesson plan book that you keep open on your desk when you are teaching a class—should contain questions and notes to yourself so that the field trip will go off easily and profitably.

There can be dangers along your proposed route—a yellow jackets' nest that you've located in advance, poison ivy, plants with attractive but poisonous red or blue berries. Route your field trip to go so far from those things that the kids don't even see them.

A circular trip is often desirable. Not that it covers any more ground necessarily, but students get the impression of having gone somewhere and having returned without retracing their steps. There is something psychologically pleasing about that. If you must return on the same path you went out on, the coming back can be made to pay off by using the coming back portion for a review or discussion.

If you are an environmental education center staff person, you should demand that the teacher of the class accompany you along with some parents. Your center policy should be: We are not an entertainment organization. We operate a serious teaching business here. We will teach your youngsters but we want you to come along also because we need your help. We also think there may be some things you would like to learn along with the youngsters so you'll be able to answer their questions back in the classroom.

Teaching in the Field

When you take your students outside they may experience an irresistible urge to run around on the grass or whatever. If that's the situation, don't immediately intimidate the class by threatening to call off the field trip. The youngsters really do want an outdoor learning experience, so draining that excess energy out of them is part of your job. There's ways I think of doing this. If they want to play tag and just run around, let them run around. If they want to roll down a grassy slope, let them roll. So, get the students leisurely tired but not exhausted so that they can then listen to what you have to say and join you in a successful trip.

You know what you want the class to learn from the trip. Therefore, you have been able to write questions in your field notebook that will elicit the answers which will constitute the subject matter of the trip. Instead of merely dispensing information, you make the learners examine. You make them describe. You make them compare. When you do that you force them to involve themselves in the learning. Involved learners are not only excited learners, but they are exciting to watch as they learn.

Be alert for lagging interest in a student. Toss a question at that person. Get everybody involved. Listen for answers that you don't agree with and deal with them gracefully, humanely, and tactfully; one person saying something wrong may represent 9 others, and you *want* misconceptions to come out so you can correct them.

When working with younger learners (especially elementary children) I have found it a good idea to stop every once in a while and sit down to discuss what we've just learned. What did we see? What did we find out? And because scientists typically write short notes to themselves in their notebooks—they don't dare trust their memories—I think we should be teaching our pupils that technique. Don't spoil it for the class by demanding letter perfect, grammatically perfect essays. Scientists don't write essays to themselves in their field notebooks. They write down the important facts. How many, how big, how long, how heavy? You don't have to write an essay to record that kind of information. Do get the youngsters into the habit of writing down simple things in their field notes.

Back in the classroom, as part of the language arts curriculum, you can all get together and decide to write an essay on, perhaps, "Our Trip to the ——", or "What We Found Out About How Trees Grow." There you *can* insist on better grammar, better sentence structure, correct spelling and things of that sort.

Encourage quick sketches when you are out in the field. Some of the youngsters will sketch with an ability that will startle you. And when you spot that youngster, be sure to let the rest of the class see what that child did because, very often, a creative individual is a somewhat withdrawn individual and needs spotlight.

Sometimes it's feasible to collect a specimen, but handle that thing very carefully. Suppose there is only one, 3-foot hemlock tree and half the class takes specimens. Soon there won't be any hemlock tree left!

It's important to be certain that at all

Field trip at Lake Champlain, Vt. **Photo by Anne Cloutier**

can't hear they get uninterested and times the class can hear. When people can't hear they get disinterested and their minds wander. They make up their own lesson plans and their own curriculum which very often conflicts sharply with what you had planned. Never talk about anything that you want the entire class to know while you are walking. Often I talk with students close to me as we walk down a path but I don't talk about the subject matter of the field trip unless it's some trivial aside like, "Oh, yes, I saw 3 of them somewhere" and the student says, "I saw 6." But if it's something like, "Well, the reason for the scientific name *Trillium* is that the flower parts are in threes" *that's* an important fact and you must wait for the whole class to gather around as you talk about it.

Prior to the trip you noted the references available in your classroom, in the library and in the environmental learning center. This knowledge enables you deliberately to put questions in your lesson plan book which can be answered by students who go to the books to look up the answers. It's criminal, I think, to give answers to questions that are in books. Environmentalists are often shocked when I say that more important than teaching about the environment is teaching people how to read and to want to read. If I can get a child to read, I can aim information at that child which will make him/her an environmentalist. It may well be that the greatest gift you can give any child in your care would be an ability to read and a thirst for reading. If you construct your questions carefully and you know the answers are in the books, you can motivate youngsters to read and report to the rest of the class what they found out. The whole class will get the benefit of the reading research.

Earlier I mentioned collecting specimens where that is feasible. Having worked with youngsters, you all know that in each group there are those quiet little people who need attention. Some of them will never cause any problems for you, whereas some of them can be serious problems. You all know that the youngster who is determined to have attention is going to get attention. The smart thing to do is recognize that and decide to make the potential problem child important. By letting that person carry your pruning shears, collecting baskets, knapsacks or other equipment, you give that person status, you give him a feeling of "belonging." If that person gets to snip the specimens with your shears and then gives them to someone else to carry, think what that does to the would be "criminal." If you've tried this approach to discipline problems you know what I am suggesting and I apologize in advance for insulting your intelligence. If you haven't tried rewarding the "criminal element," try it. It can accomplish some amazing behavioral changes!

Where it is possible and desirable it is a good idea to pause and review some of the things you have been talking about, some facts and concepts you have been learning, questions you've been answering. If you require note taking every once in a while, that will indicate to the youngsters that the field trip isn't just a fun afternoon outing. It is serious business. You ask questions for which they have to find answers. Call on students to give answers—that will keep discipline problems to a minimum. Watch out for the student with wandering attention; that's the person to whom you should direct questions. Try to assign responsibilities so everyone has something to do.

There are all sorts of follow-up activities and methods of evaluation that we could discuss here, but I would rather postpone that until after we've gone on a short field trip to learn some things about how trees grow. Then we can sit down on the lawn for a leisurely discussion.

You have been a patient, friendly audience and I do thank you. Now let's go on a field trip!

With careful preplanning, and good class organization and motivation, field trips can be an important learning tool. Once back in the classroom there should be follow-up activities and evaluations to bring the experience into focus. □

PROJECT WILD

(continued from page 4)

– 12 –

You are on a field trip with your class to the zoo. Although you know that feeding of the animals by zoo visitors is prohibited, some of your friends are feeding marshmallows to the bears. Do you:

- tell them that feeding marshmallows to the bear may harm it and ask them to stop
- report their behavior to the nearest keeper
- ask the teacher to ask them to stop
- not do anything
- other

– 13 –

You are the judge in a case where a man has been charged with shooting a deer out of season. He has been unemployed and is using the meat to feed his family. Do you:

- give him the maximum punishment and put him in prison for nine months
- fine him $500
- release him with a warning
- other

– 14 –

You are an influential member of the community. On your way home from work, you are stopped by a police officer, and cited for having excessive auto emissions. Do you:

- use your influence to have the ticket invalidated
- sell the car to some unsuspecting person
- work to change the law
- get your car fixed and pay the ticket
- other

Extensions and Variations

1. Adapt this to a debate format!
2. Write and discuss your own dilemmas!

Evaluation Choose a dilemma. Write a short paragraph on the positive and negative effects of all the options listed for that dilemma. Indicate what additional information, if any, is needed in order to make a responsible and informed decision. Identify what seems, in your judgment, to be the most responsible decision—and explain your reasoning.

PROJECT E.G.R.E.T.

Robert Moeller, *Northeast Region of the National Audubon Society, R 1, Box 171, Sharon, CT 06069*

Project E.G.R.E.T. (Environmental Goals, Resources, and Educational Techniques) is designed to help the Chapters of the Northeast Region of the National Audubon Society become more involved in environmental education in their local areas. We realize that the Northeast Regional staff is much too limited to effectively reach all those in need of environmental education. Although some of our Chapters are quite involved with environmental education, many are not. It is therefore the purpose of Project E.G.R.E.T. to encourage and support the increased environmental activities of our various Chapters; to encourage them to become involved with youth groups either of their own organization or those currently organized; to urge them to become more active in their local schools; or to do whatever environmental activity fits the members of the particular Chapter.

There are many ways that a Chapter can become involved in environmental education, and a number of these are stressed in the packet of materials and resources that is step number one in Project E.G.R.E.T. The materials include written sheets on how to begin, how to inventory the local area in terms of human, financial, material, and facility resources. Other sheets include information on working with youth groups already in existence, how to get into the schools, and provide contacts for previously developed and proven youth education activities by other Chapters.

The packet also contains a number of brochures describing environmental education curriculum guides and activity based programming. These include the *Sourcebook* from the American Institute of Architects, the *Environmental Education Activities Manual* by Cox and Stapp, *Living Lightly in the City* from the Schlitz Audubon Center, *Project Learning Tree* from the Western Regional Environmental Education Council and the American Forest Institute, *Yankee Lands* from Antioch/New England, and *Outdoor Biology Instructional Strategies* from Delta Education.

There are a number of state specific items included in the packets that are worthy of note. The State of Vermont provides an Energy Education Program for school systems in the state. The Vermont Extension Service did an inventory of the state in terms of environmental education programs and opportunities. Connecticut has just put together environmental education material in three graded folders that are available through a workshop presentation. These and others are included in the appropriate packets.

Also included in the packet are a number of materials that are produced by the National Audubon Society. These include leader discussion sheets on the films *Project Puffin, The Last Stronghold of the Eagles,* and *A Time for Survival,* brochures on our education oriented adult summer camps, TV spots, and several items from the Audubon Center in Greenwich.

Project E.G.R.E.T., step one, was launched during the spring and early summer of 1983 with presentation to the Audubon Council members in Maine, Vermont, Upstate New York, and Long Island. From the response, we expect a continuing series of workshops with our Chapter leadership during the coming school year. These workshops will constitute step two. □

CORPORATE ADVERTISEMENTS AND ENVIRONMENTAL FUTURES:

A Working Methodology to Decode the Ideological Content of Advertisements

Mitchell Thomashow
Co-Chairperson, Environmental Studies
Antioch/New England Graduate School, Keene, New Hampshire

The purpose of the workshop is to present participants with a working methodology that will enable them to analyze corporate advertisements that deal with environmental issues. The methodology is designed as an inductive/deductive conceptual process that will enable users to subjectively determine the controversial issues that are inherent in the advertisements. The methodology can be applied in various public education and classroom settings.

Why Analyze Advertisements?

Within the ideological content of everyday life there are complicated values dilemmas. These dilemmas often represent *controversial issues* which address fundamental choices and perspectives about future directions that our society might take. Ideological content often hides these controversies or it defines the controversies within a particular, narrowly articulated perspective. *Ideological content* creates the boundaries of meaning for individuals within a culture. It represents the shared meanings which are so deeply embedded that they are the building blocks, the very foundation of the value systems and world view that determine one's understanding of everyday life.

Issue advertisements which convey various points of view that corporations may have on political, social, economic, and environmental matters are an interesting and powerful everyday life representation of ideological

content. These advertisements often contain complex controversial issues which are sometimes explicitly framed and other times implicit within the values assumptions made by the advertisement.

The ads methodology is designed so that it can be integrated in a variety of public education or classroom contexts. It can fit into a larger conceptual teaching unit and it is flexible enough for various disciplines.

The ads methodology follows the conceptual outline listed below:

1. Users must respond to the ad emotionally, then interpret their response.
2. Users must expand their personal interpretation so that the content of the ad can be more objectively analyzed.
3. Users must compare their interpretations to other interpretations.
4. Users must identify what the advertisement says about the world.
5. Users must identify the controversial issue in the ad, and analyze implications of that issue.

EXERCISE 1: FREE ASSOCIATION

The purpose of this exercise is to facilitate a personal response to the symbols and text of an advertisement.

1. One of the main purposes of an advertisement is to grab your attention. You are compelled to look at the ad because it presents interesting, pleasing, or unusual images. Look at the advertisement before you. Write down the images or words that most clearly stand out.
2. The advertisement consists of images, symbols, and text. *Images* are the pictures that are presented to you. *Text* represents the words that are used to describe the meaning of the advertisement. *Symbols* are the words and pictures that have deeper meaning for you. They cause you to develop additional images as a response to the original image or text.

Look at the advertisements again. Focus on the images and text that were most meaningful to you. Immediately write down any additional images that come to mind.

3. Identify the images and text that have symbolic meaning for you.

EXERCISE 2: SEEING THE WHOLE AD

1. Carefully read the text of this advertisement. What are the key words in the text? How do these words relate to the remainder of the advertisement?
2. How is the key text linked to the key symbols?
3. Now that you have studied the entire advertisement, try to analyze the message. What do you think is the most important message that this advertisement is trying to convey? Substantiate your claim.

EXERCISE 3: THE INNER MESSAGE

The purpose of this exercise is to determine what the advertisement tells us about the world we live in, how it portrays the world of the future, and how it addresses important environmental issues.

Advertisements address important environmental issues in one of several ways:

- by alerting your attention to the importance, complexity, or controversy of the issue.
- by stating the company's position on the issue.
- by stating what the company is doing about the issue.
- by stating what the company feels society should do about the issue.

1. Try to determine how the advertisement addresses important environmental issues. Does the ad that you're looking at conform to the categories listed above? State specific examples of how this occurs.
2. The next step is to understand how the symbols and text in the ad substantiate the message. You can get at this information by concentrating on the following questions: According to the ad, why is the issue important? Why is the issue complex? Why is the issue controversial?

EXERCISE 4: THE CONTROVERSIAL MESSAGE

The purpose of this exercise is to understand how controversial issues are portrayed in advertisements. Messages are controversial either because they directly address a controversy or because they state such a strong point of view that they seem to assume that there is no controversy.

For this exercise it will be helpful to work with a small group.

1. Determine whether the advertisement addresses an important controversy or seems to ignore an important controversy. Substantiate your claim. If it ignores a controversy, go to question 13.
2. Is the controversy stated as an either/or position or does the message allow for a compromise? If it's stated as a compromise, go to question 8.
3. If it is stated as an either/or position, are the two points of view clearly represented? Can you clearly articulate the two points of view?
4. What accounts for the differences of perspective?
5. What are the fundamental value judgments that are representative of the different perspectives?
6. What perspective do you agree with? Is there anything about the advertisement that influences you to agree with a specific perspective?
7. Are the perspectives fairly represented? Why or why not?
8. If the message articulates a compromise position, what is the compromise?
9. Does the compromise seem like a legitimate solution? Why or why not?
10. Is the compromise really a compromise or does it just give lip service to the alternative point of view?
11. What value judgments represent the foundation of the compromise position?
12. Can you describe an alternative compromise solution that would be preferable to the one that is offered?

If the message seems to ignore an important controversy, follow the line of inquiry below:

13. What controversy is the advertisement ignoring?
14. Why is the advertisement ignoring the controversy? Is it doing so consciously? How can you make such a determination?
15. Is the message designed to convince the reader of a particular point of view? What is that point of view?
16. How does the advertisement do its convincing? What evidence does it use to substantiate its point?
17. What are the assumptions behind the perspective conveyed in the ad? What would an alternative perspective be? □

THE WATER DISCOVERY CENTER:

A Cooperative Effort of the Youth Science Institute, Santa Clara Valley Water District, and Santa Clara County Parks and Recreation Department

Carolyn J. Tzitz
Youth Science Institute, Los Gatos, California

The Youth Science Institute is a nonprofit organization providing a variety of science programs through their three discovery centers to the residents of the Santa Clara Valley in California. Traditionally offering natural-history oriented programs, YSI has recently broadened its focus to other science areas such as computer education, solar energy, cement technology, and water managemnt and conservation. The Youth Science Institute has provided programs for school children for 30 years from their San Jose headquarters through visits to schools, school visits to the site and extended trips in the summer.

The Water Discovery Center at Vasona Park

The Youth Science Institute opened its discovery center at Vasona Lake County Park with plans to focus on water ecology and conservation. With financial assistance from the Santa Clara County Fish and Game Commission, eight 55-gallon aquariums were set up to display local and native fishes. Specimens in the display include largemouth bass, pumpkinseed, bluegill, green sunfish, channel catfish, brown bullhead, golden shiner, Sacramento perch, common sucker, black crappie, riffle sculpin, California newt, western pond turtle, crayfish, various frogs, and aquatic insects.

Nine panels were designed to be used with visiting school groups and a YSI docent, but could also provide information on water to the casual visitor as well:

PANEL #1: **Why We Need Water**

Before scheduled school groups visit the center, the students will be participating in pre-trip activities that look at their own personal water use. The first panel serves as an introduction and a connecting link between the pre-trip activities and the actual trip to the center. Various illustrations show how water is used by plants, animals and people. Graphic representations of the percentage of water contained in plants, animals and human bodies are also compared.

PANEL #2: **What's In A Drop?**

Clear water is not always as pure as we think. This panel features a large three-dimensional drop of water, showing many of the more common elements found in a drop of water.

PANEL #3: **The Water Cycle**

This panel illustrates how water travels in a simplified cycle.

PANEL #4: **Water in the Valley: A Historical View**

This panel presents a historical background of water use in the Santa Clara Valley. Primitive peoples lived close to water sources. As populations increased, people placed greater demands on local water sources, therefore aqueducts and pipelines were constructed to meet the increasing demands. Photographs and drawings are highlighted on this panel.

PANEL #5: **Where Our Water Comes From**

Residents of the Santa Clara Valley get their water from one or a combination of three sources: groundwater, the South Bay Aqueduct, and the Hetch Hetchy Aqueduct. This panel displays maps that show the routes the water is carried to the South Bay Area.

PANEL #6: **Where Our Water Goes**

This panel features the path of water once it goes down the drain. Photographs and drawings illustrate the wastewater treatment system.

PANEL #7: **Groundwater Basin**

Since two-thirds of the valley's water comes from underground aquifers, groundwater is a special concern. This panel shows how we get groundwater, what happens when too much groundwater is removed, and how percolation ponds help recharge the groundwater.

PANELS #8 and #9: **How We Use Our Water/ How We Save Our Water**

These two panels contain a collection of photographs depicting various household, commercial and industrial uses of water, and ways water can be conserved.

A package of materials has been designed for classes visiting the center for a four-hour program. The packet is sent to a group two weeks before they are scheduled to visit the site. Students look at how they use water in their lives, tallying each time they use water for three days, and calculating their daily average water consumption.

The program at the center begins with a discussion of their classroom activities relating to water, using the nine wall panels. Armed with data pads, pencils, water testing kits and sampling equipment, the group then heads down to the lake, and then to the creek. Sampling and testing are done, comparing and contrasting the lake and creek communities. The group returns to the center to scrutinize smaller critters under the microscope, and further analyze data collected in the field. The group then sees a short film, "Water Follies" and discusses when water was wasted and when water was conserved in each segment of the film.

The packet also contains suggestions for classroom activities to follow up the visit to the center. Some of these activities include fish behavior experiments, erosion studies, water management decision-making simulation, field trips, etc.

This project, begun in February 1982, has been the result of many cooperating agencies. Santa Clara County Parks and Recreation Department has supported the development of this center in their park. Substantial support, both financial and in-kind, has come from the Santa Clara Valley Water District. The Town of Los Gatos has also supported the center with Federal revenue-sharing funds for the past three years. The community has made contributions as well. Donations have made the purchase of equipment possible, and several scout groups have contributed to the improvement and maintenance of the native plants on the hillside below the center. Two Eagle Scout candidates are designing the drought-tolerant landscaping. Another scout has recently completed a weather station for the center which will allow students to compare water and meteorological data.

Several school groups have participated in trial uses of the materials and exhibits. Evaluations returned by participating teachers indicate that they find the center an excellent resource for taking a look at various aspects of water management and conservation, and how they connect to aquatic ecology studies.

ENVIRONMENTAL EDUCATION...In Any Subject For Any Age

Richard J. Baldauf

Museum of Science and History, Little Rock, Arkansas

Slide presentations designed for lay audiences not particularly tuned to environmental issues should emphasize and provide examples to indicate that everything we do is related to such issues and that our daily routines teach lessons to others. In this presentation I have also shown that Environmental Education (EE) is not reserved for the science classroom and that teachers can approach the issues through any subject at any grade level. (Emphasis is given to non-biological topics.)

The Environmental Decade–the 1970s

A description is given to indicate that (1) important regulations were passed by Congress to reduce environmental degradation, (2) more people than ever before are looking to the natural setting for their recreation (or more appropriately written "re-creation"), and (3) EE is important to all teachers and not only to those in the sciences.

Human History–Fine Art–Architecture–Politics

Works of architecture and fine art are being damaged, with perhaps the more appalling consequences being the effect of acid deposition on the Coliseum, the Parthenon, da Vinci's Last Supper and Michelangelo's David, and more. The fact that these creations are dissolving or otherwise changing calls for an understanding of acids and alkalis and the relationship of pH to fine art, architecture, household cleaners, agriculture, aquatic biology, and human health. It also calls for strengthening rather than relaxing current air quality standards to reduce the amount of nitrogen and sulphur oxides released to the atmosphere.

Agriculture–Biological Diversity–Pesticides

Small family farms and large monocultures of agribusiness are compared. The difference between the two in biological diversity is related to crop damage by insects and diseases and their control with synthetic pesticides. The ubiquitous nature of chlorinated hydrocarbons is illustrated by penguins which contain such compounds in their body fats, and the fact that no one flew over the South Pole to spray penguins. It is evident that we all have a world-wide influence by supplying chemicals to the earth's ecosystems.

Bangladesh–Population–Resources

Third World countries are compared to developed ones in relation to natural resource use and need. Bangladesh equals Arkansas in size, but its human population exceeds 93 million. The use of natural resources in Third World nations is compared to that of the United States, where 6% of the world's population uses about 45% of the world's natural resources.

Flooding–Venice–Land Use

Historic Venice with its Byzantine architecture of St. Mark's cathedral floods regularly. Some of this flooding is due to (1) land subsidence caused by pumping water to the surface from beneath the islands, and (2) the destruction of nearby marshlands that formerly served as giant biological sponges to soak up water that would otherwise flow onto Venice. Land use decision is related to flooding.

City Planning–Architecture–Steams

New and old buildings are compared to show the folly of city planners who sometimes allow the construction of new, modern structures beside ancient, classical ones to produce scenes of incompatibility.

Poor city operations often cause increased costs for taxpayers. An example is given of a city allowing a contractor to build residences on what was known to be a flood plain. After houses were flooded the city made its second mistake by straightening out a nearby stream to carry away flood waters. This engineering project ended in erosion and increased maintenance costs, and the stream continued its natural tendency to meander.

Corporate Advertising and Hamburgers

Several advertisements from nationally distributed magazines are used to indicate the hidden and often devious corporate messages of great environmental importance. The fast food hamburger operation with plastic boxes is described. It "blows their mind" when you request a hamburger without the box! (It's noted that many people do not know that plastic is a petroleum product.)

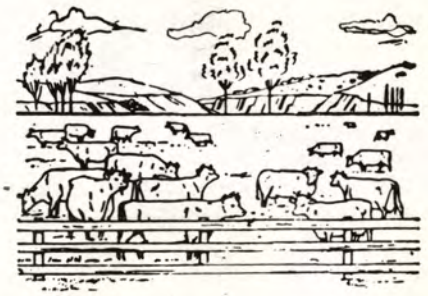
Signs in Your City

The practice of looking at signs is sometimes a source of humor.

Several examples are given, including a sign advertising "simulated vinyl auto seat covers." Do they use leather?

Arithmetic and Natural Resources

An environmental lesson can be given by having students calculate the per-fluid-ounce cost of their favorite beverage in a throw-away can and in a returnable container. Students determine that it costs money for the convenience of discarding a container. Such a lesson can lead to a good discussion of the need for the United States to rely on natural resources from many nations and that international policies are based on such needs. Resources, greed, and lifestyle often determine global political decisions.



If It Grows...Cut It Off!

A case is made against the removal of roadside vegetation either by mechanical cutting or by using herbicides. Sometimes we spray herbicides on green plants to produce death-brown in summer (when plants are designed to be green) and green paint on dormant lawns in the fall (when certain grasses are designed to be brown). For some reason we don't like the way nature arranged the colors and seasons.

Water–Recreation–Litter

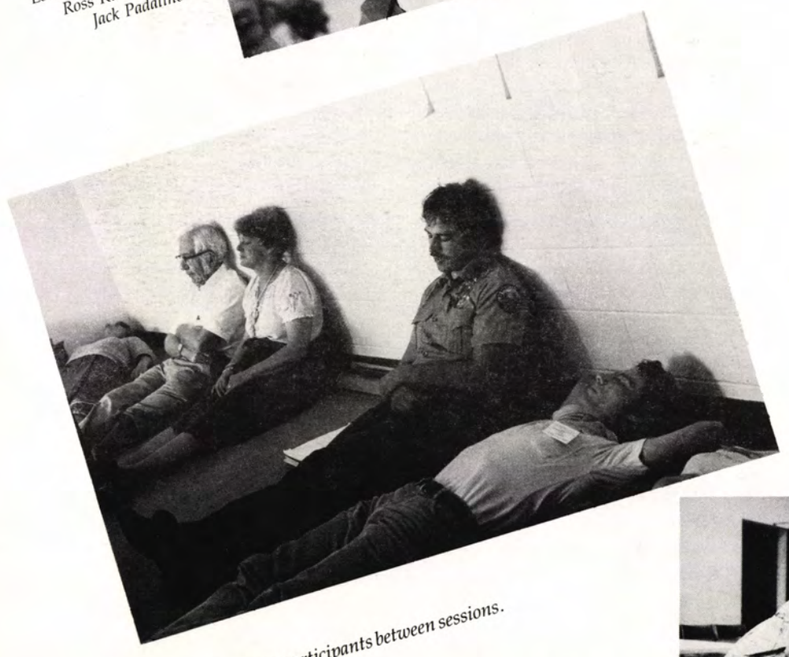
Emphasis is given to the apparent human need for water-based outdoor recreation. Recreational areas are often littered after a weekend of vacationing, although much litter is composed of items intended to be thrown away. How can we teach the need to recycle in order to conserve natural resources?

ANSS CELEBRATES ITS

75th Anniversary

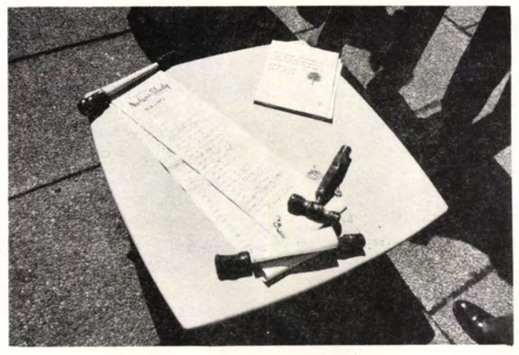
ANSS President Talbert Spence presenting Distinguished Service Awards to (from left to right) Louise Ritsema, Helen Ross Russell, and Jack Padalino.

Passing the gavel from ANSS President Talbert Spence to President-Elect John Kirk.



Weary Congress participants between sessions.

Photo by Anne Cloutier



ANSS Scroll and Gavel.

Past Presidents of the ANSS at the Burlington Environmental Education Congress, University of Vermont, August 1983 (from left to right): Verne Rockcastle, Bill Stapp, Glidden Baldwin, John Gustafson, Helen Ross Russell, John Kirk, Howie Weaver, Bus Fowler, John Green, Talbert Spence, and John Padalino. (Not pictured but present: John Brainerd and Dick Baldauf)

Photos by Ray Pfortner

Marty and Corky at the ANSS Luncheon, Burlington Environmental Education Congress, University of Vermont, August, 1983.

ANSS Past President John Brainerd.

Highways–Automobiles–Floods–Poetry

Water normally soaks into soil. The impermeability of cement, plastic grass, and blacktop prevents such soaking and causes water to concentrate as flood waters. Flooding is often the consequence of our actions.

Highways were treated in a special way by a 10th grade student in English Composition:

The car is my tyrant; I cannot breathe.
It maketh me to drive on hot asphalt;
It leadeth me past full parking lots;
It rattleth my soul;
It leadeth me in the paths of destruction
for Detroit's sake.
Yea, when I drive on the highway
in the shadow of death
I will fear much evil; my car is with me;
Its cost and exhaust they madden me;
It prepareth monoxide before me in the
presence of repair bills;
It filleth my lungs with pollution;
my eye runneth over.
Surely smog and congestion will follow me
all the days of my life and I will dwell
in the chaos of cars forever.

It is noted that the classroom environment had to be proper to allow a student the opportunity and confidence to write this way. Most important is that this writing came out of English Composition and not a science class.

We Love Gadgets

Our desire to reach out-of-door serenity is stimulated by the daily chaos of our lives. Some people may even regard the trash compactor as a source of chaos. This ingenious device is capable of taking 10 pounds of trash and converting it...to 10 pounds of trash! What an advancement! But it has buttons and switches, and we love gadgets.

We're All Different, But We Need the Same Future

Individual differences of people are shown to be important constituents of environmental problems, but that finally we all need to share the same attitude toward the universal laws that govern the earth. Attention is given to the importance of sharing our love of nature with others. This is necessary not to increase the quality of our lives, but to be sure a worthy Tricentennial can be celebrated by our grandchildren's grandchildren. The quality of the environment for those who follow us is our responsibility. That is the future of Environmental Education.

It is finally suggested to take a child by the hand and walk to the middle of a forest or prairie, to kneel down and close the eyes...and "Listen to the Earth." □

TEACHING STUDENTS TO WRITE

Maxwell Corydon Wheat, Jr., *editor of the New York* Communicator

There is nothing wrong with a little copying for a student to get started writing poetry—whether child or adult. Use a poem like the following by Richard Lewis, but underline the words specifically dealing with the subject. Have the student replace these with other subject words, retaining the others. It is not hard for a student to come up with a poem like Audrey Kent, a seventh grader in Farmingdale, New York.

Tonight, in the sky
Even the stars
Seem to whisper
To one another.
Richard Lewis

Tonight, in the forest
Even the trees
Seem to chatter
To one another.
Audrey Kent

You can do this with salt marsh grass, waves coming over the lake, mosquitoes buzzing in the ear. The technique is that the writer is using a model—consciously so. After all, you are not teaching students to write poems for some big publication; you are teaching them to write poetry.

Another good model is "Poem"—that's what he calls it—by William Carlos Williams, M.D. He was also a pediatrician besides being a leading American poet and his books are in many libraries. Actually, this poem is about a cat climbing/ stepping down "into the pit/ of the empty/ flower pot." Have student underline words about the cat and what it is doing, then substitute words for another animal.

Being able to actually copy some of the poem—beginning and connecting phrases—gets the writer started. The very act of writing can produce ideas (so never let the student get away with "waiting for inspiration.") Of course, if the student wants to change more in the poem or write a completely different poem—that is splendid. In fact, that is what you really are headed for in your teaching of poetry, that students will more and more find their own voices.

Another good teaching technique is to have students write down the most interesting facts you tell them about an animal. Then rearrange these facts in order of interest so that the most dramatic is at the end. Sometimes, they won't use all the facts—maybe just one significant one as seventh grader Rose Robedee of Farmingdale did after learning, among other things, that the bluefish has pouches on its face.

I swim in the water
I mind my own business
Here comes a fisherman
He lures me with bait
I eat it and it hurts me.
The hook rips the pouches on my face.

One question: should the phrase "and it hurts me" be taken out?

"To be committed to a future today
is to be committed to life."
Noel Brown

From California they come
From Maine, South Carolina
The Illinois teacher meeting her students
for early morning walks across
thirty-seven years.

From Michigan they come
From Oklahoma, Oregon
The Colorado teacher leading his handicapped
to Alpine flowers of the Rockies.

From Georgia they come
From Iowa, Pennsylvania
The New York teacher helping her students
plant trees on the streets of
Bedford-Stuyvesant

From Arizona they come
From Wisconsin, Florida
The Texas teacher showing his farm pupils
"meadows of love"

From nature centers they come
From universities, institutes, fish, forestry,
soil services
From Project Wild and Learning Tree
From 4-H, Audubon, Human Habitat.

"The kid has the
planet within him."
Michael Cohen □

SUCCESSFUL TECHNIQUES FOR MAKING BASIC SCIENCE ENVIRONMENTAL

Phyllis S. Busch, *Author/Teacher, Lakeville, CT*

I. INTRODUCTORY IDEAS

A. Comparison between present times with pre- and post-Sputnick times generally, and especially in education–pitfalls to avoid
B. Importance of a global view
C. Money is not the only answer
D. Necessary steps for immediate curriculum revision
   1. Newest findings in brain research and learning–4-MAT SYSTEM
   2. More schooling and start younger
   3. Degrees in EE and OE often undereducate. A solid basis in all the sciences, math, social studies, statistics, computers–all needed in order to recognize and understand environmental problems. These subjects must therefore be taught environmentally.
   4. A compulsory course at both H.S. and college levels in "How to Solve Environmental Problems."

II. SELECTED TECHNIQUES

Selected science techniques for illustrating the above, emphasizing teaching science environmentally and extending the teaching outdoors.

A. The study of dandelions and the importance of weeds (see *Nature Study*, vol. 37, no. 1 & 2).
   1. An example of dandelion's great adaptability to survive illustrated by its growing both in sunlight and in shade. Students are asked how they think the surface area of leaves growing in sunlight compares with that of leaves growing in the shade. Students go outdoors and collect 6 sample leaves from dandelions growing in the sun and 6 from plants that grow in the shade. Students form pairs, plan how to measure the surface area of each leaf, and obtain an average surface area. Measurements are made, a class average is then obtained and conclusions drawn. Results are interpreted and used to explain how the plant is adapted to survive in any kind of light.
   2. Other uses of dandelions are discussed such as the uses of flower and leaves as "paint," dandelions as food, rubber, etc.
   3. Other weeds that have been found to be important
      a. Perennial corn in the Amazon (ours is annual)
      b. Oil from the desert plant jojoba can replace sperm whale oil
      c. Some leguminous weeds can restore great amounts of nitrogen to the soil (There are 18,000 species of legumes in the world).
      d. Linoleic acid (G.L.A.) is found in evening primrose
      e. The red-berried sumacs offer opportunity to combine history and nutrition with natural history
B. In similar manner, considering the various types of learners (as in the 4MAT System) and emphasizing the teaching of science environmentally, and extending that teaching outside the classroom door, the following topics with their appropriate techniques are presented:
   1. The structure, geologic history, and the use of horsetails *(Equisetum)* in our economy.
   2. The study of pH and acid rain
   3. The study of the yeast plant, its reproduction, population growth life and death of a population
   4. The value of open space and the production of oxygen.

III. SUMMARY

A. Good nature study is good science-it emphasizes awareness, stresses beauty and joy, allows for expressions of feelings in a variety of ways.It is taught ecologically, environmentally, both indoors and outdoors (LAURENCE PALMER, RICHARD FISCHER, BILL STAPP, CHUCK ROTH, HELEN RUSSELL, STAN MULAIK, VERNE ROCKCASTLE, RUTH MELVIN, OTHERS)
B. The important aspects of nature with which we should be concerned pithily summed up by geographer Yi-Fu Tuan;
   1. Thoughts and feelings about nature
   2. What nature is-the science of nature (all the basic sciences)
   3. How we behave in and make use of nature
C. These three aspects of nature should be inherent in teaching science (or any other subject)

Marina Stern

TYPICAL TOPIC

SUMAC

This shrub or small tree is an abundant, easily available wild food, something to get just for the taking. The plants are frequently found along roadsides, in vacant lots, where soils are apt to be dry and poor. There are several kinds of Sumacs and they usually grow in thickets.

A single dropped seed gives rise to a plant which is either male or female

since Sumacs are dioecious (male and female flowers are borne on separate plants). The plant forms root sprouts which give rise to additional plants, all of the same sex as the parent. These vegetatively-formed new Sumacs grow in a circular clone (meaning that all develop from a single ancestor) with the younger ones around the edges. Thus, a stand of Sumacs may be crowded with pyramids of red fruits because it is a female stand, while a male thicket remains fruitless.

Smooth Sumac has hairless or smooth twigs and branches. It may grow 25 feet tall. Staghorn Sumac may grow considerably taller. It has fuzzy hairs along its twigs and branches which make an attractive outline, especially when seen against the sun. The upper branches are spread apart, somewhat resembling a stag's horns.

Both shrubs have compound leaves made up of 11 to 31 leaflets. Their wine-colored pyramidal fruits hand in bunches (panicles) all winter. They are especially attractive against the snow.

The fruits are a source of malic acid which makes a refreshing drink, containing some vitamin C. These edible fruits cannot be confused with the fruits of Poison Sumac. Poison Sumac grows in WET places and bears WHITE fruits. Sumacs with red fruits are perfectly safe.

Each little fruit has a seed surrounded with a fleshy layer inside a hairy covering. The hairs contain the malic acid. Bite a bit of the fruit and you will taste the acid as you bruise the hairs.

Indians collected the fruits and used them all year long. At one time Sumacs were used as a source of tannin and medically, for a gargle. In addition they were used for making a drink. Today Sumac is used chiefly for making a beverage.

To prepare the drink use either Smooth or Staghorn sumac. Collect some and hang them up in bunches, to be used as desired. Six heads of fruits will make about five quarts of drink. Pull the fruits off into a bowl, cover with cold water, and crush with a wooden mallet or bottom of a jar until the water turns a pleasing pink. Do not boil. Strain through two layers of cheesecloth to catch the hairs and the dust. Sweeten with honey as the Indians did. Serve hot or cold. It is delicious either way.

When things look gray this winter, think PINK and fix yourself a SUMAC drink. □

PROJECT FOR AN ENERGY-ENRICHED CURRICULUM MICROCOMPUTER PROJECT

Edward C. Hall, Jr., *Wayland High School Science Department, Wayland, MA 01778*

Introduction

During the summer of 1981, the National Science Teachers Association carried out Project for an Energy-enriched Curriculum (PEEC) with funding from the U.S. Department of Energy. The project was based at Technical Education Research Centers in Cambridge, Massachusetts, and focused on materials appropriate to high school students. The overall goal was to create usable software packages that dealt with energy topics. The units now undergoing teacher review and testing are described below. All are intended primarily for high school and junior high school use, and some are also appropriate for use in junior colleges.

1. "Power Plant Engineer"
   (TRS-80 and Apple II)

   This program is a simulation of an electric utility. The student will operate a system consisting of ten power plants in order to provide electric power throughout a given day. Success on this simulation is based on the number of points accumulated. Points are awarded for meeting demand without an excess, choosing the most inexpensive options, anticipating future demand, and adjusting for randomly occurring breakdowns. The simulation is complex and will require students to learn realistic strategies for operation of an electric utility.
2. "Energy Conversions"
   (TRS-80 and Apple II)

   This program serves two purposes. First, it can be used as a resource base for students and teachers. The program will allow the user to make conversions from one energy unit to another (i.e., tons of coal to barrels of oil). The second part of the program calls for problem solving with the use of the conversion factors. Students are asked to set up problems based on fuel type, efficiency, fuel use, and energy produced.
3. "Personal Energy Inventory"
   (TRS-80 and Apple II)

   Students learn about their own consumption of energy by using this program in combination with a survey of personal energy use. Students are asked to keep track of their energy use for a series of days. This includes transportation, heating, hot water, appliances, and other uses of energy. They enter the data from their survey into the computer each day. Then they can use the results to compare two separate days, or compare their use to local and national averages.
4. "Temperature Grapher"
   (Apple II)

   This program utilizes a thermistor (temperature-sensitive) probe that plugs into the game paddle input on an Apple II computer. Students can use one or more thermistors to record graphically the temperature in a variety of laboratory experiments. Students can use this thermistors in many energy applications. For example, measurements of temperature inside a solar collector can be recorded and saved on the computer. Temperature changes of different materials can be recorded simultaneously by using two thermistors.
5. "Home Energy Savings"
   (TRS-80 and Apple II)

   This is a game that can be played by one or more students. The object of the game is to make sensible investments in energy conservation in the home. In the process of playing the game, students learn about various insulation methods, storm windows and doors, furnace replacement, thermostat lowering, and other conservation measures. The program involves students in friendly competition for energy savings.
6. "Electric Bill"
   (TRS-80 and Apple II)

   In this program students learn about the computation of an electric bill. The students can see the different parts to an electric bill and then learn the methods used for calculating a given bill. In addition to numerical computation, students can see the computations of various bills in a graphic form. Several rate structures are illustrated in this program.

For more information, contact:
HRM Software
Department NSTA
175 Tompkins Avenue
Pleasantville, NY 10570
Call toll free: (800) 431-2050
(In New York, Alaska, Hawaii & Canada, call collect: (914) 769-7496) □

"A WALK WITH ROBERT FROST"

(A field exercise/workshop conducted by John A. Gustafson)

John Gustafson reads poetry by Robert Frost on his "Walk with Robert Frost" field trip.
Photo by Anne Cloutier

It has been said that poetry (at least of the lasting kind) leads us from consideration of the "particular" to thinking about the "general," and ultimately focuses attention on the "universal." Environmental education attempts to do just that! Unless we move students from the *details* of nature to the *grand themes* of the universe (or even of our globe!), the behavioral changes we desire will not occur.

The use of good nature poetry (such as written by Frost) in field settings is an effective way to enlarge and give emotional content to ecological ideas. In addition, it is a beautiful melding of science and the humanities, of the study of nature and human nature.

This "walk" is conducted in silence (except for the readings), through a natural area in which objects or situations illustrated in the poetry are found. The poetry and the natural setting speak for themselves. It has been found to be highly effective.

For more specific details and ideas, see "Field Trips for Feelings", *Nature Study* vol. 25, no. 4, Winter, 1971-72, and "A Poetry Nature Trail," *Nature Study*, vol. 35, Nos. 3 & 4, September, 1982 (both by John Gustafson).

PROJECT LEARNING TREE

(continued from page 23)

Invite the student to trace their favorite things back to their origins. Encourage them to find out whether their things are entirely forest products. Ask the students to include any resources which were used in the manufacture of each item, and any which contributed in bringing the objects to the students. Then ask the students to make pictures representing all the material and energy inputs in the entire journey of their objects from the forest to its present location. (One could create a wall mural starting with photosynthesis!).

Ask each of the students to count the number of times there was a transfer of energy in the total production and transportation of the favorite thing. Ask each to write an equation to represent all the resource inputs on one side, with the pleasure of the student in having or using the object on the other. Are they equal? Are there other factors to account for?

Suggest that each student look again at the picture of all the resources involved in the production of the favorite thing. What else could have been made from the same materials which made the favorite thing?

Ask the students to continue the pictures to represent where their favorite things will go when they are through with them; for example, through use on to eventual decay. The students can determine the life expectancy of their objects, determining how long it will take their objects to be converted through decay into soil. (See, "How Do You Bury a Pile of Dirt?").

EXTENSIONS

1. Decide whether each "favorite thing" could have been made out of some other, nonrenewable material; for example, a petroleum-based product. Create a picture to represent the energy and material inputs involved in the creation of the object in this way. What other things could have been made from these materials? Continue the picture, tracing the rest of the object's journey to eventual decay.

2. As a group of students, do improvisations or charades for the rest of the students expressing the roles your favorite things play in your lives. □

TECHNIQUES AND PRACTICES IN ENVIRONMENTAL ACTION PROJECTS

Michael Zamm, *Director of Environmental Education*
Council on the Environment of NYC
51 Chambers Street, Room 228, New York, NY 10007

Teachers, youth leaders, and community activists who are doing environmental education need to become aware of a number of techniques and problems in organizing neighborhood based environmental projects. These projects may involve classes or youth groups of junior high school, high school, and college age. Difficulties are sometimes encountered in training youth to organize environmental projects in a neighborhood setting. Some community groups tend to "pull" students away from legitimate training needs and into repetitive, non-growth producing service activities, and to develop power structures whose growth conflicts with student development. In the case of school programs, how and on what level we enter the school system to initiate an EE training program are important concerns. Various strategies which help initiate a program in a school include making initial contacts on a principal, curriculum coordinator, or teacher level and, wherever possible, building a program from the grass roots up to the central board of education level.

During our workshops we laid out the foundation for organizing two projects that two of the participants were interested in implementing in the communities in which they live and work. An energy conservation education program targeted at the Audubon Naturalist Society and the general public in Washington, D.C. was discussed. The initial project strategy and tactics were to develop some kind of demonstration project focusing on key energy conservation needs, e.g., home and apartment weatherization, based on a survey to be mailed out to all Audubon Naturalist members and selected citizen groups as well.

The second project dealt with organizing a youth coalition in a high school in a small town in upstate New York. The immediate task of the coalition would be to highlight the misuse of part of the townscape for "touristy" attractions. The workshop participants helped the youth organizer, who is a 4-H Environmental Program Coordinator, to decide upon the strategy of training members of the youth coalition to give guided walks to citizens and other youth to highlight the character of the town and its surrounding area. The group spent a significant amount of time helping the 4-H program person come up with ideas to essentially organize the two-front project: the youth coalition and the related urban awareness program.

Through the discussion of these projects, the key organizational concepts to teach youth about as they learn to do environmental action were stressed: choosing an issue, a related project, and the strategy and tactics for project implementation; stimulating on-going participation; and doing an evaluation. As the workshop came to a close, a number of the participants came up with ideas for projects with youth in communities where they live or work. □

KNOW NUKES: A MODEL FOR TEACHING CONTROVERSIAL ISSUES

Mitchell Thomashow
Co-Chairperson, Environmental Studies
Antioch/New England Graduate School, Keene, NH 03431

The purpose of this workshop is to present participants with teaching techniques that are useful in controversial issues education. Although nuclear power is the content area of this workshop, the techniques presented can be implemented in a wide range of disciplines and in many educational contexts. Exercises and activities covering techniques of persuasion (with emphasis on bias, propaganda, and ideology) and moral dilemmas (with emphasis on values analysis) are the foundation of the workshop.

There are three key components in the KNOW NUKES educational strategy:

1. Development of a planning process that integrates the interests of diverse participants and perspectives.
2. Development of a training model that enables participants to effectively introduce controversial issues in educational settings.
3. Development of a curriculum design process that enables the participants to effectively implement a product.

CONTROVERSIAL ISSUES EDUCATION

Controversial Issues Education is used here to refer to an educational process that is developed to help students understand the content, the different perspectives, and the moral dilemmas that are intrinsic to scientific, philosophical, political, and social issues that impact society.

An important component of controversial issues education is cultivating an appropriate **community of controversy,** or those individuals and interest groups that are key participants in the discourse surrounding a controversial issue. "Community" implies that the participant establish communication rules that enable them to openly express their points of view regarding the controversy.

Some of the virtues of controversial issues education:

- allows for development of reflective critical thinking
- allows individuals to become involved in issues that directly affect them
- elevates the discourse surrounding the issue
- potentially involves the school and community

OUTLINE OF ACTIVITIES FOR KNOW NUKES PRESENTATION

1. Introductory exercise examining the educational implications of advocacy positions in the nuclear power controversy.

2. General introduction to controversial issues education highlighting the importance of controversial issues, the difficulties teachers often encounter in presenting them, the value of various techniques for teaching about controversial issues.

General comments on nuclear power education.

3. Slide show depicting the KNOW NUKES INSTITUTE held at Antioch/New England Graduate School (Keene, New Hampshire) during the summer of 1982.

4. Techniques of persuasion and the nuclear power controversy.

Activity using comic books about nuclear power:

Mickey Mouse and Goofy Explore Energy (Walt Disney Educational Media Company)

All-Atomic Comics (Educomics)

A. Participants work in small groups which are balanced according to their predispositions regarding nuclear power.

B. Participants read comics noting those aspects of the comic which are: 1. good educational techniques; 2. of personal appeal; 3. poor educational techniques; 4. particularly manipulative.

C. Participants exchange these observations.

D. Short lecture on bias, propaganda, and ideology highlighting some typical techniques of propaganda.

E. Participants reread comics attempting to identify particular forms of propaganda as they find them in the text.

5. Moral dilemmas as a teaching technique.

A. Participants work on the "Transporting High Level Waste" moral dilemma as it's described in the KNOW NUKES CURRICULUM GUIDE.

B. Participants work in small groups and develop a moral dilemma which can be implemented in a community education or school context.

INTRODUCTORY EXERCISE

The purpose of this exercise is to point out how the emotional aspects of the nuclear power controversy must be understood and clearly articulated.

Carefully read the following passages which describe political strategies of different advocacy groups:

"The nuclear controversy involves people's hearts more than their heads. The public isn't won over by facts and statistics. The nuclear debate isn't over whose facts are correct, but, instead, who can come up with the greater hazard and have it successfully perceived so by the people. So forget the facts once in a while. Counter the activists not with facts but with closed factory gates, empty schools, cold and dark homes and sad children...Once the emotional chord is struck, the sound will carry to the State and Federal political arenas where the outcome of the nuclear controversy is being decided."

"The anti-nuclear movement in the U.S. has adopted one basic strategy in its effort to stop nuclear power. That is to create enough public pressure so that the government and nuclear industry will find it too costly—both politically and financially—to proceed with their nuclear designs. Local oppositions wage desperate fights against nuclear power, project by project. Taken as a whole, this opposition is forging a movement that will be heard."

With your small group discuss the *educational* implications of those comments.

OVERVIEW OF PROPAGANDASTIC TECHNIQUES

These propagandistic techniques are listed in *The Propaganda Game* by Robert W. Allen and Lorne Greene (WFF N PROOF GAMES).

Many of them are used in the nuclear comic books.

A. **Habits of Reflective Procedure (Techniques of Self-Deception)**

1. *Prejudice* An unwillingness to examine fairly the evidence and reasoning in behalf of the person or thing which is the object of the prejudice.

2. *Drawing the Line* Sharp distinctions are drawn where it is inappropriate to draw sharp distinctions.

3. *Wishful Thinking* You believe a proposition to be true because you want it to be true.

4. *Tabloid Thinking* To oversimplify a complex theory or set of circumstances.

5. *Causal Oversimplification* A complex event is explained by references to only one or two probable causes whereas many are responsible.

6. *Inconceivability* You declare a proposition to be false simply because you cannot conceive it actualized or possible of realization.

B. Watch Their Language AND YOURS TOO (Techniques of Language)

1. *Emotional Terms* Word or phrase which, however much factual information it conveys about an object, also expresses and/or arouses a feeling for or against that object.

2. *Quotation Out of Context* The effect of quoting a given statement without its context is to distort the original meaning in context.

3. *Ambiguity* A word or phrase that has two or more meanings and the interpreter is uncertain as to what was meant.

C. **How Suggestible Are You? (Techniques of Irrelevance)**

1. Appearance
2. Manner
3. Degrees
4. Numbers
5. Status
6. Repetition
7. Slogans
8. Technical Jargon

D. **What's Your Weakness? (Techniques of Exploitation)**

1. Appeal to Pity
2. Appeal to Flattery
3. Appeal to Ridicule
4. Appeal to Prestige
5. Appeal to Prejudice
6. Folksy Appeal
7. Join the Bandwagon Appeal
8. Appeal to Practical Consequence

E. **The Fault May Be With the Form (Techniques of Form)**

1. *Concurrency* Because things exist or appear simultaneously, it is claimed that one is the cause of the other.

(continued on page 51)

EDUCATION FOR THE HUMAN HABITAT

Workshop leaders: Dean Bennett, *University of Maine at Farmington*
Robert Darula, *University of Wisconsin at Green Bay*
William Hammond, *Lee County Schools, Florida*
John Padalino, *Pocono Environmental Education Center, Pennsylvania*

This workshop was sponsored by the Human Habitat Study, Inc., a non-profit educational organization dedicated to the maintenance of a healthful and healing global environment. Through its center at the University of Wisconsin at Green Bay, a program is being initiated and designed to bring a whole-world view to formal education—a view which also encompasses a responsibility for stewardship of the planet, our human habitat. To achieve its goals, the Human Habitat Study, Inc., is exploring all avenues of research on the brain/mind system, learning styles, instructional methods, educational technology, learning environments, evaluation techniques, and program implementation strategies.

Workshop Objectives:

1. To demonstrate why we believe the Human Habitat Study, Inc., is needed.
2. To define concepts of the human habitat and discuss a whole-world view as a foundation for a curriculum.
3. To demonstrate some of the instructional approaches we are using and present some of the exciting research on which they are based.

Workshop Strategies:

1. **Right/left brain inventory**

The following informal, "loosely valid" test can be given in a "light" manner as a means of demonstrating differences among individuals. It is also fun and a good mixer.

Left/Right Brain Inventory

Directions: Indicate which one of each pair of choices below are most like you or whether both are equal. (The left column is thought to be associated to a degree with left brained dominance and the right with right dominance.)

1.	Like algebra	Like geometry
2.	Like cats	Like dogs
3.	Impulsive	Reflective
4.	Remember faces	Remember names
5.	Analytical	Holistic
6.	Verbal	Visual
7.	Work sequentially	Work simultaneously
8.	Procedural	Interpersonal
9.	Go by the facts	Go by intuition
10.	Organized	Emotional
11.	Right handed writer	Left handed writer
12.	Never have motion sickness	Easily have motion sickness

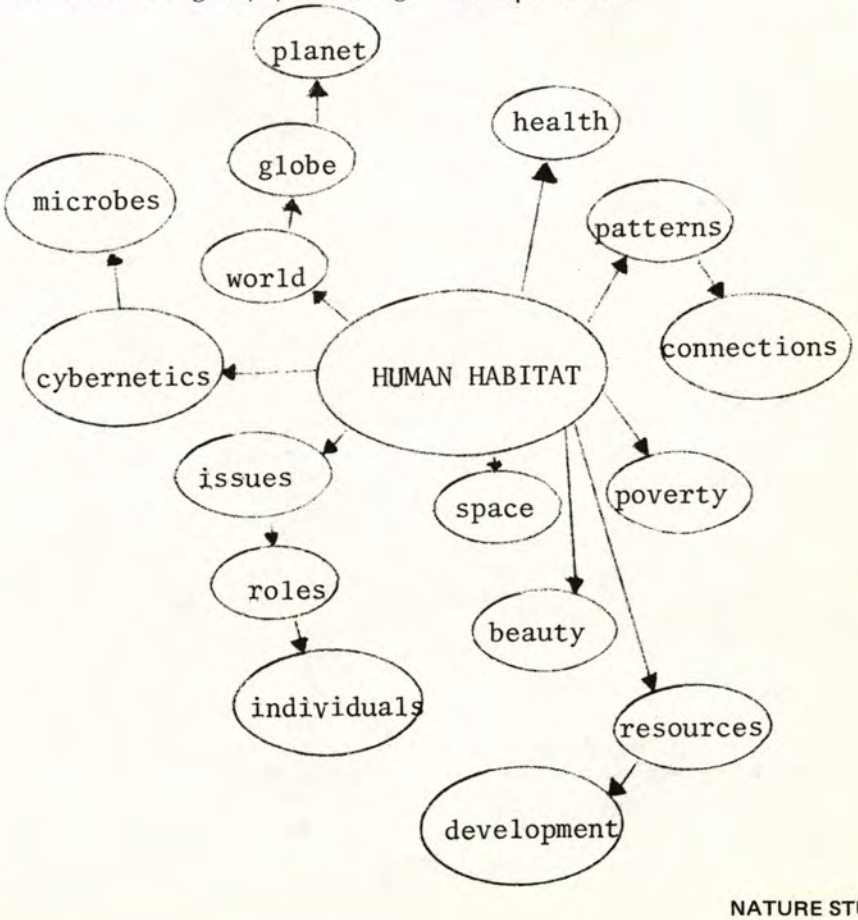
2. **Defining the human habitat– a basis for curriculum**

Once participants have completed a brain dominance inventory, a workshop facilitator can do a number of interesting activities to demonstrate differences. He or she can have them pair up according to the largest number of similar responses or by the greatest number of differences. The pairs can be asked to solve problems, create drawings, design objects, write paragraphs, etc., in order that the special characteristics of differences in brain dominance be demonstrated. This workshop used the brain dominance test to explore definitions of human habitat as a beginning step in developing a curriculum.

As an introduction, a major point of rationale was first presented: students in formal education have little opportunity to develop a whole-world view—a global understanding—by synthesizing what they have learned in the separate disciplines. It is further believed that a planetary view of our human habitat is essential if we are to understand and anticipate those problems which thwart our search for a quality of life and even threaten our survival as a species. It was also explained that a beginning strategy is to develop a curriculum as a basis for programs of instruction at all levels. Such a curriculum should, among other things, define how the world works; in short, present a view of our human habitat.

After the above introduction, the group was divided into "whole-brained" teams of three or four based on the brain dominance inventory. Each team, if possible, included R, L, and Integrated individuals. The objective was to produce a definition of the human habitat as a vignette and as a visual image.

The member of each team worked together to do a clustering activity around the words HUMAN HABITAT. (This is based on the book by Gabriele Rico, *Writing the Natural Way*.). See example below:



Half of a team then wrote a short vignette and the other half created a visual image on an overhead transparency. The objective was to create views and definitions that would provide a basis for an educational program. All members in a team shared their views, discussing how their perceptions differed and why.

Each team then shared with the entire group the written and visual concepts of the human habitat.

3. **Creating an Instructional Activity**

This part was introduced by discussing a strategy for developing a variety of instructional programs based upon a curriculum that defines the human habitat. The Human Habitat Study, Inc., is exploring applications of the results of many exciting research and development activities, including brain research, learning styles, and computer technology. One example is the work of Bernice McCarthy and David Kolb relating to learning styles and the 4-Mat System. Although this workshop reviewed an activity which could be developed based on the 4-Mat System, a better approach would be to have participants in R/L teams design a simple activity, for example, to learn about an environmental issue or topic. □

AUDUBON ECOLOGY WORKSHOPS, CAMPS AND SEMINARS: FIELD EDUCATION

Philip P. Schaeffer and Jean Campbell Porter
Audubon Center in Greenwich, Connecticut

The Audubon Camp at Greenwich, Connecticut, was the second nature center to be established in the U.S., when it opened its doors in 1941 (See *Environmental Field Study Centers, Nature Study* volume 33, number 4). Today, Audubon Camps are located in Maine, Connecticut, Wisconsin, and Wyoming. Live-in programs lasting a week or more are supplemented by thousands of weekend and one day sessions led by staff and trained volunteers. Annually these reach hundreds of thousands of teachers, children, and other persons interested in learning about the outdoors and the interrelationships which are basic to planet Earth.

Teaching in these centers always involves outdoor experiences which include things like observation, experimentation, measurement, comparison, recording, searching for answers and similar activities. The programs are also supplemented by games and simulations. These activities may be preparatory in nature, teaching observation, measurement and other field skills. They may be used to impart information as children or adults make observations and draw conclusions; as such, they are excellent training for asking questions, reasoning, and approaching subjects with a spirit of scientific inquiry. Finally, these activities can provide drill and reinforce ecological concepts.

For instance, a personalized demonstration on adaptations that touches all participants can be carried out by taping players' thumbs firmly to the side of their palm; then challenging them to put a band aid on a wound, tie a bow, model a pot out of clay, make a folded paper fan, etc.

Camouflage, as an adaptation, may be explored with many games involving different colored papers, toothpicks, counters. Thus the advantage of sexual dimorphism in birds may be introduced by scattering equal numbers of peanuts and brightly colored candies in an outdoor setting.

All teaching can be enriched by this type of activity while it provides a change of pace in the learning process. □

STRATEGIES FOR INVOLVEMENT IN WILDLIFE ISSUES

Carolyn L. Kennedy, *Director*
Donna I. Nye, *Program Specialist*
Elliott Wildlife Values Project, Girl Scouts of the U.S.A.

Our workshops session discussed the treatment of controversial issues with children and presented guidelines typically provided by school districts or organizations. To exemplify the kinds of activities which might be used to stimulate discussions among children, the participants were divided into subgroups. Each group received instructions and materials for familiarization with a particular environmental issue. The three issues used were: endangered species, acid rain, and predator control. Each group prepared and shared information about a particular issue with the entire group.

I. Endangered Species/ Species Extinction

The actions of humans are bringing about the extinction of large numbers of animals and plants. Species extinction is now accelerating and will reach disastrous proportions during the next 20 years.

No one is sure of the number of living species of plants and animals, including such small forms as mosses, insects, and minnows, but estimates run between 5 and 10 million worldwide. A conservative estimate of the current extinction rate is 1,000 species a year, mostly due to the accelerating destruction of tropical forests and other key habitats. During the next 30 years, fully 1 million species may be erased. The current rate is already by far the greatest in recent geological history; it is vastly higher than the rate of evolution of new species.

In our own lifetime, humanity will suffer an incomparable loss in aesthetic values, practical benefits to the biological sciences, and worldwide environmental stability.

An "endangered" species is one on the brink of extinction throughout all or a significant portion of its range. A "threatened" species is one likely to become endangered within the foreseeable future. As of August, 1981, 278 native U.S. animals and plants were listed for protection under the Endangered Species Act of 1973 which provides federal protection.

To help reach the goals of the Endangered Species Act, the U.S. Fish and Wildlife Service is working to develop recovery plans for all listed species native to the United States. A

recovery plan is a guide that identifies, describes, and schedules the reactions necessary to restore these plants and animals to a more secure biological condition. Because of limited funding and the large number of listed species, recovery plans are carried out on a priority basis. Those creatures that are in the most immediate danger, whose life requirements are best known, and that are most unique, generally come first.

Things to Think About

— What species are endangered in your state?
— How could you find out?
— What are the major causes of species endangerment?
— What efforts are being made to protect their habitats?
— How can we reduce the loss of wildlife habitat?
— What resources are available to learn more about endangered wildlife?
— What effects have pesticides had on wildlife?
— How does one place a "dollar value" on wildlife - is one species worth more of an investment than another?

INSTRUCTIONS

1. Divide your group into age level specialities.
2. Each group will outline a series of activities appropriate to its age level group that could be part of the decision-making process about this issue.

II. Predator Control/ Use of Compound 1080

Last year the Environmental Protection Agency conducted hearings to reconsider its 1972 decision to cancel the use of Compound 1080 to control coyotes and other predators. A court decision was made to authorize the use of Compound 1080 on a limited basis.

Predator control is an emotional issue—livestock growers claim large financial losses from predators, especially from coyotes. Environmentalists claim that Compound 1080 is a nonselective poison, that it is not humane, and that it kills vast numbers of other wildlife such as badgers, ferrets, eagles, owls, etc.

The setting is an EPA Hearing in Salt Lake City, Utah:

Pro Use of Compound 1080
Sheep Rancher
Head of the National Woolgrowers Association
Government Predator Control Agent

Against Use of Compound 1080
Audubon Society member
State Fish and Game Biologist
Humane Society Director

Each side should present its case to prove or disprove that Compound 1080 should:
1. Be deauthorized for use
2. Be authorized for use with increased regulation
3. Have widespread use again

Remember, this is a very sensitive issue and the EPA is under heavy pressure from environmental groups across the country to disallow the use of Compound 1080.

III. Acid Rain

Some people feel that acid rain is the most serious environmental problem facing our nation in the 1980's. Others believe that little statistical information exists to prove that the problem of acid rain is that serious. One noted economist was quoted as saying that he "questioned the economic importance of a few fish in New York's Adirondack Mountains."

Situation

A citizens' action group in Lakeview, a small town in northern New York bordering Ontario, has recently completed an analysis of a nearby lake. Their findings included the following:
The lake has a pH of 4.4
No trout, frogs, or salamanders were found
The lake appears to be very quiet.

After seeing the results of the study, the Citizens Action Group organizes, in conjunction with the local cable TV station, a debate on the acid rain issue.

The issue to be debated is: Acid rain is a serious environmental concern that needs Federal regulation.

Speaking on the affirmative side will be: State Fisheries Biologist; Official from Kingston, Ontario; Izaac Walton League Member. Speaking on the negative side will be: President of a Gary, Indiana coal-fired plant; Concerned Taxpayers; Vice-President of the Lakeview Industrial Revitalization Program.

The debate format will be:
Opening Statements–3 minutes each
Rebuttals–3 minutes each
Closing Statements–3 minutes each

After the debate, the studio audience will be polled to determine the winner. □

RECOMMENDATIONS FOR EE

(continued from page 20)

sound. Further, those curriculum development efforts should result in curricula suitable for utilization at each academic level.

It is also recommended that existing programs and projects in both formal and non-formal EE be analyzed with respect to the goal levels which they address. Such analyses would reveal accomplishments and deficiencies in specific curricula. Further, deficiencies once identified could be addressed, thereby contributing toward the strengthening of existing EE curricula.

RECOMMENDATION THREE:

Additionally, there exists an immediate and critical need for inservice teacher education in the field of EE. Again, there is need for goal-oriented teacher education at all academic levels and for all goal levels.

In order to address this need, it is recommended that extensive inservice teacher education be undertaken by teacher education institutions, and EE agencies and organizations. Inservice teacher education should be made available, and participation should be encouraged, for teachers at all academic levels. Educational efforts should focus on all four of the goal levels, and should develop in participants an understanding of the goals for EE and the knowledge and skills necessary to successfully utilize goal-oriented curricula. □

THE CONTROL OF HAZARDOUS WASTES AND THE ROLE OF ENVIRONMENTAL EDUCATORS

Ray Pfortner, *U.S. Environmental Protection Agency Region II (NY, NY)*

Can you answer the following:

1. In your state, the telephone number for reporting:
   a. oil and chemical spills is _____; and
   b. suspicious dumping and debris is _____
2. Your state has _____hazardous waste sites on the National Priorities List of sites eligible for Superfund cleanup monies.
3. Your state has an approved hazardous waste disposal facility—true or false.
4. Your state has established siting criteria for locating new hazardous waste disposal facilities—true or false.

As an environmental educator, you should be able to answer all of these correctly and to discuss their implications fully. Hazardous waste—and their control—is the key environmental issue of the 1980s. Yet so many of us are all-too-often uninformed or worse, misinformed. What is needed is a thorough-going dialogue; what we usually have instead are fears, anxieties, objectives, and inaction—especially on the critical question of siting new disposal facilities.

Congress has established three main pieces of legislation aimed at the hazardous waste issue and which are being implemented by USEPA and the states:

1. **Toxic Substances Control Act** (TSCA, passed in 1976)—with a focus on new products prior to their introduction, it is a notification law;

2. **Resource Conservation and Recovery Act** (RCRA, also passed in 1976)—the focus here is on the waste stream of industry; it provides for the permitting of hazardous waste generators, transporters, storers, and disposers; it is designed to track hazardous waste from the "cradle to the grave" by means of a manifest system; it requires a post-closure plan for hazardous waste facilities, including ongoing monitoring and liability insurance; and

3. **Comprehensive Environmental Response, Compensation, and Liability Act** (CERCLA, passed in 1980)—it establishes a trust fund from a combination of taxes on the chemical industry and general tax revenues to be used to clean up abandoned hazardous waste sites where responsible parties either can not be identified or refuse to take action.

CERCLA is the stopgap, short-term, immediate solution to a problem with a long history. As recently as the late 1970s, despite the heightened public environmental awareness and concern of the time, as much as 90 percent of the hazardous waste generated in this country was disposed of improperly, primarily in unlined surface lagoons and unsecured landfills. With CERCLA, also commonly known as "Superfund," we are trying to catch up. TSCA and RCRA are designed to complement Superfund, by preventing past problems from recurring in the future.

Keep in mind that in 1980 the U.S. produced 57 million metric tons of hazardous waste. And it takes very little hazardous waste to contaminate a great deal of groundwater. Today, with more sophisticated analytical techniques and equipment, we measure drinking water contamination in parts per billion (ppb). One second in thirty years is one ppb.

Superfund involves a maximum fund of $1.6 billion available through 1985 to cleanup target sites identified across the nation. These eligible sites are nominated to EPA by the states and ranked on a National Priorities List by means of a ranking system which scores the contamination from the site in the air, groundwater, and surface water. EPA has inventoried almost 16,000 uncontrolled hazardous waste sites nationally; 539 are on the latest proposed Priorities List Update issued last September.

Perhaps the best way to realize the complications of Superfund and to be sensitized to the real threat of uncontrolled hazardous waste in the environment, is by working through the following Case Study. In doing so, try assuming the role of consultant to the USEPA. Read through the Background section, and complete the two-part Assignment. As with most exercises, the most is to be gained by working in teams.

ABANDONED ACRES SUPERFUND SITE: A Case Study

Ray Pfortner

Background

The Abandoned Acres Site is a 2-acre chemical dump located in the woods off two major roadways. Witnesses confirm the dumping of drummed wastes (and possibly of bulked liquid wastes as well) from approximately 1956 to 1970.

Today, about 50 drums are scattered on the surface of the site. Most are badly corroded, many appear to have been intentionally punctured. Some crushed drums still contain wastes, which now lie exposed at the surface. Substantial areas of the site are subsiding, apparently as the underlying drums collapse with time. Glass bottles, pipettes, and other laboratory equipment are scattered over the site as are solidified plastic resins. A trench at the northeast edge of the site appears to have been used for bulk liquid disposal.

Soils in the area are sandy with interspersed clay layers resulting from glacial outwash. There are two aquifers of importance in the area, the Kellog, a shallow water-table aquifer, and the Canon, an underlying regional aquifer. The two are separated by a clay layer, the extent and continuity of which remains unclear.

The Canon Aquifer is the source of drinking water for all private and municipal wells in the area. Only shallow irrigation wells like those at Victory Farm tap the Kellog. Municipal water from distant wells in the Canon Aquifer is now piped to the Urbane Apartments, Victory High School, and the Canon Condominiums. Nearly all private homes have their own private wells in the Canon Aquifer. The condominiums have a major well in the Canon, which is used for lawn watering and to fill Lake Canon, a man-made impoundment. This well is also part of the municipal water supply system in Anxious Township, held in reserve for use only in emergencies like the failure of an existing well or a major fire.

Sampling of visible wastes at the

site and of two shallow ground-water monitoring wells (K-1 and K-2 in the Kellog Aquifer) and one deep ground-water monitoring well (C-1 in the Canon Aquifer) indicate that hydrocarbon solvents and degreasers, heavy metals, and pesticides were all dumped at the site. The Kellog Aquifer in the vicinity of the site is significantly contaminated with all of these. The Canon Aquifer appears contaminated with hydrocarbons, although the drilling technique used in constructing C-1 may have introduced contamination from the upper aquifer.

Assignment

1. In light of what you know about the Abandoned Acres Site, what alternative would you suggest for cleaning up the site? Describe the environmental and health and safety impacts on nearby Anxious Township residents and on workers on the site of your proposed solution. Describe how clean you would make the site.
2. Develop a comprehensive approach to the site. Establish what additional questions, if any, need to be answered about the site. Describe the next steps to be taken (consider immediate site security, further investigation, studies of cleanup alternatives and their impacts, and immediate cleanup).

After completing the Abandoned Acres Site Case Study, you should have a greater awareness of the entire hazardous waste issue. The solution for cleaning up the Abandoned Acres Site you first proposed in #1 probably did not seem so simple after further discussion. In developing the comprehensive approach called for in #2, did you provide for ongoing citizen involvement?

Major, sticky questions, as illustrated in working through the Case Study, abound in the Superfund program and the hazardous waste issue in general: When is a site cleaned up enough? Is on-site entombment a viable alternative? (Before you answer this, what if the site is in your backyard?) Where should excavated wastes be taken? (Are we simply creating future Superfund sites somewhere else?) And first and foremost, where and how do we site the new hazardous waste processig and disposal facilities we so desperately need (e.g., secure landfills, incinerators, waste exchanges), and who can take the responsibility for operating them if and when they are sited?

The stumbling blocks are only partially technological. Public awareness and perception are even more critical to the solution of the hazardous waste issue. Too many people are not fully environmentally literate, only sensitized and more aware. Consider how many people even know something as basic as where their drinking water comes from or where their own sewage and garbage go. How many have taken the time to frame the question?

A major charge to and challenge for environmental educators in the 1980s is to promote a truly rational discussion and thorough-going understanding of the hazardous waste issue, and exactly what is and what is not involved in its resolution. Within the issue, the question of where to locate new hazardous waste processing facilities is probably the thorniest. □

RESOURCE CONSERVATION SOFTWARE COMPETITION IN CALIFORNIA

Carolyn J. Tzitz
Youth Science Institute, 296 Garden Hill Dr., Los Gatos, California
with Richard Wenn, *Kenwood, California*

"Computers can improve our lifestyle...if you program them to." Thus, the first Resource Conservation Software Competition was launched in California. The competition was an effort to develop computer software on energy and water conservation by encouraging young computer programmers to use their talents on a creative, productive project. The end results provided educators with software that promotes resource conservation. The first competition was sponsored by the OAT (Office of Appropriate Technology) and co-sponsored by the State Department of Education, ATARI, Bell & Howell, Commodore, Radio Shack, Texas Instruments, Sacramento Science Museum's "Science Delta Project," and the Santa Clara County Youth Science Institute.

Brochures describing the competition were available through the Office of Appropriate Technology (OAT), and were distributed through libraries, teachers, retail computer stores, and co-sponsors. Five program challenges, written in script form, were developed dealing with water and energy management. Students, working individually or in teams, were to develop a program. All programs were to be written in BASIC, Machine, or Assembly language. Entries were judged on degree of innovation, creative use of graphics, efficient program structure and the programmer's ability to translate the Competition program challenge into an interesting, accurate, and educational computer program.

Rules & Guidelines

Any California resident under the age of 19 was eligible for the Competition. Each individual or team entering the competition was required to enlist a person as an official advisor. The advisor could not be involved in the actual programming or design, and did not have any authority to make decisions for the entrant.

All entries become the nonexclusive property of the State of California. The programs that won awards or citations are available SOFTSWAP, a San Mateo County Office of Education and Computer-Using Educators program, and through other interested educational organizations in California.

Participants could write a program for any brand of computer, but arrangements were made to judge programs that could be run on ATARI 400 or 800, any Commodore with a 40-column screen, Radio Shack Model I, III or color computer, Texas Instruments 99 or 99/4a, and Apple II or II+. If the program was written for any other machine, the entrant could be asked to provide a system for the judges' use to review the program.

Program Challenges

The program challenges guided participants through an educational experience as well as assured that a high quality program would be produced for educational use. The five challenges were "Food and Energy," "Energy Management," "Insulation and Your Home," "Water Manager," and "Water Conservation and Your Home."

Each challenge is organized in frames, with each frame divided into three (3) parts. The top portion of the

page gives suggestions for graphics or is labeled "Graphics As Desired." The middle portion contains the text that should be on the screen. The bottom section contains notes to the programmer, including additional notes regarding the graphics.

The programmer could make changes in the sequence and structure of the challenge, but the concepts had to remain the same. Information could be added if it related to a change in the program design. The text could be shortened, lengthened or replaced, but had to remain grammatically correct.

Evaluation of Programs

Program judging was a 3-phase process. The first phase checked the software to assure that the program was complete, and that the rules and guidelines were followed. This first review was conducted by OAT.

The second review was conducted by people who were not computer-wise, testing the program's ability to communicate to the general public. The Santa Clara County Youth Science Institute conducted the judging in two local computer stores, and the Sacramento Science Museum held the judging at a local junior college. In this phase, the programs were judged on presentation. Judges checked to see if the program operated easily, had clear instructions, captivated the interest of the user, corrected an incorrect answer in a pleasant manner, gave a second chance to answer the questions, and supplied the right answer if the question was not answered correctly. This phase also rated the graphics. Was the screen easy to read? Did the graphics: relate to the script, keep your attention focused on the program, add to the enjoyment of the program, and add to the educational content of the program?

The final phase of the judging reviewed the technical expertise and innovation displayed in the program. Only programs that scored high in the second phase were judged in the third phase. Four (4) computer-using educators judged this phase, carried out at the Alameda County Office of Education. Use of computer capabilities, memory and original script were among the items evaluated.

Prizes & Commitments

Contact was made with manufacturers of educational computing equipment, including Apple, ATARI, Bell & Howell, Commodore, IBM, Radio Shack and Texas Instruments, to gain their support and to encourage the donation of prizes for the competition. After several proposals and counter-proposals, all companies agreed to donate $1,000.00 of software and/or hardware for prizes, except IBM and Apple. IBM was interested but did not have a policy to address such a request and was unable to prepare one in a short time period. Apple declined to participate in the competition (due to the amount of requests they receive and corporate policy.)

Benefits & Costs

The most obvious product of the competition was the software that has been produced. Based on the cost of developing similar software on home energy conservation in another OAT program, the competition was cost effective given the software developed alone. The cost of the OAT produced software was $2,000. The budget for the competition, including 380 hours of OAT staff time, printing and workshop costs, was $20,000.

The greatest benefits were educational. The competition provided incentives to some of California's best young programmers who in a few years, if encouraged, will strengthen California's work force. The award winners were not the only participants to benefit. Telephone conversations with participants who did not submit programs for judging indicated that they did learn a great deal, and in some cases, more than they might have if they had taken a semester-long class.

The program challenges themselves received attention as workbooks that teachers could use in class activities not associated with the competition. It would not be surprising to see new versions of software based on the program challenges appear from time to time.

Summary

A young person's enthusiasm for learning while working on a meaningful project is unequaled. In the short run, statewide recognition and material prizes were rewarding to the students participating in the competition. In the long run, skills were developed that may help strengthen the California work force.

Time and resources were invested in this project due to the collaboration of government agencies, nonprofit groups, and youth science centers. Responsibilities and costs were distributed so that the program was affordable. The activities necessary to implement the competition improved the skills of the OAT staff as well as the co-sponsor staffs, helping them develop their understanding of a powerful new tool for communication. Co-sponsors provided material benefits to the sponsors through either software produced, publicity, staff training, or accomplishing an activity that corresponded to the mission of the project and the organization.

A competition is being organized for the 1983-84 school year in California. This indicates that the Resource Conservation Software Competition not only achieved its goals, but provided a model for future activities.

*This review is meant to merely give an outline of events. Specific questions can be addressed to:

Richard Wenn
Competition Director
900 Adobe Canyon Road
Kenwood, CA 95452

If you wish to receive copies of the program challenges, please write to:

Irene Banks
California Energy
Extension Service
Office of Planning & Research
1400 10th Street
Sacramento, CA 95814

Copies of award-winning software can be obtained through:

SOFTSWAP
c/o SMERK Micro-
computer Center
333 Main St.
Redwood City, CA 94063

For a more complete listing of software, send $1.00 for catalog. □

"INTEGRATING EDUCATION AND COMMUNITY ACTION"

Nancy A. Wolf, *Executive Director,*
Environmental Action Coalition, New York City

"Integrating Education and Community Activity" focused on the use of two educational models—urban forestry and recycling—to establish the needed link between school and community and to better facilitate ongoing learning among students and their families and neighbors. In both instances, programs developed by the Environmental Action Coalition were first explained, with the use of materials that were distributed to the workshop participants and the showing of EAC's film, "Something for the Trees...Something for the City." Among the materials distributed were "Green Spaces in City Places," and "Don't Waste Waste," both curricula written and tested by EAC Staff. Other materials were also distributed, including "What's A Tree To Me?" written and edited by Dr. Verne Rockcastle of Cornell University.

The excellent geographic distribution of the dozen participants was extremely helpful to the ensuing discussion. Included in the workshop were an experienced "hands-on" practitioner who had developed many similar models in working with urban children in Ohio, and two New York City teachers who had carried out programs based on EAC's work. In addition, representatives of 4-H work in upstate New York brought a different perspective to the use of projects not based in formal school settings, and an educator from Virginia, who had been hired as a consultant by citizens seeking to stop environmental degradation in the "hunt country" near Charlottesville, was seeking specific suggestions for community education through involvement.

There was a consensus from the start that environmental education models focusing on participation in the community were among the best that young people could enjoy. A primary thought was that of creation of "meaning" for a project and the understanding that a project directly showing benefit to the community was highly motivative. Intergenerational aspects were also discussed, in the sense that projects such as tree care and recycling immediately assure that young people of all ages will be directly involved with adult citizens and often older members of the community who have volunteer time to spare and are, therefore, usually quite involved.

Another aspect discussed was the need for teachers to understand that these types of participatory environmental education projects work closely into the ongoing curriculum that they must show to their supervisors. Both scientific concepts and skills and multidisciplinary social science projects work beautifully with these suggested programs. Team-teaching is a natural outgrowth of such projects, also.

The group believed that urban teachers should be encouraged to execute this type of environmental programming and that the ideas could work in any setting. In the case of urban environmental education, participatory education with the community was seen as an ideal way to erase barriers often present between community and school.

Lastly, it was discussed that this type of participatory education benefitted both quick and slow learners. EAC, in testing the projects, was gratified to see special education classes particularly enjoying the tree care lessons and bilingual students using the words needed for specific projects to learn new vocabulary. On the other hand, excellent students can use participation in community projects to expand knowledge and research and to spark formal training in such curriculum areas as botany and chemistry. □

Elements of a Workable Strategy for Developing and Maintaining Nationwide Environmental Literacy

Charles Roth
Chief of Interpretive Services, Massachusetts Audubon Society

In setting out to discuss strategies for developing and sustaining environmental literacy we must face up to the fact that strategy is essentially a military term and that we are indeed engaged in a war—a war against the forces that alienate people from Nature.

The objectives of our war are straightforward enough:

Produce a citizenry that

a. understands the self-regulating systems of our life-sustaining planet.

b. operate their lifestyles in congruence with those self-regulating systems.

c. work cooperatively to eliminate cultural activities that significantly disrupt the life-sustaining systems.

Such citizens are considered to be environmentally literate.

In order to achieve these objectives our educational institutions, both formal and non-formal, will have to:

- Provide adequate direct experiences with Nature so that learners develop an understanding of how the planet's self-regulating systems operate to sustain life over time.
- Enable learners to acquire needed skills for making sound choices in their lifestyles and consumption patterns.
- Help them examine built environments to create and evaluate design criteria that meet human needs with minimum disruption to natural systems.
- Maximize individual's ability to make use of community restoration and self-help projects.
- Provide instruction in evaluating the environmental health and safety of various workplaces and the risks relative to work environments.
- Foster learner's capacities to openly and safely share and examine differing feelings, attitudes, and values.
- Foster an ongoing maturing of views leading to respect for Nature.

With the current political interest in upgrading the nation's educational system, this seems a good time to press strongly to initiate some educational reforms that meet our objectives. Education was a major topic at the recent

Governor's Conference in Portland, Maine. The focus, of course, was on the economic value of education since good education means well prepared workers and thus a good climate for business and industry and a strengthening of the economy. This is generally true but where were the discussions of education to provide well informed citizens who can create good government and maintain a healthy life-sustaining planet? It would be nice, but naíve, to think that such was just taken for granted. Chances are it was not even considered. Such are the forces shaping current world views.

AWARENESS CAMPAIGN

The forces of our culture which promote and reinforce our alienation from Nature are so generally pervasive that they are taken both for granted and for gospel by millions of Americans. A lobbying campaign, along with a media campaign, will have to challenge people to rethink their lives and consider what kind of a world they are creating for their children and grandchildren.

We need this kind of public awareness campaign to generate the people who will become involved in the next aspect of our strategy—local citizen groups that will assess what is happening in the local school systems toward building environmental literacy in its graduates. Such individuals or groups need to develop an assessment checklist that includes such things as:

- At what grade levels and in what subjects are topics dealt with that promote environmental literacy?
- Is there any coordinated curriculum effort to develop such literacy?
- What direct, reflective, experiences with natural and built environments (field trips, residential outdoor programs, walkabouts, etc.) are provided?
- What percent of the budget is specifically allocated toward developing environmental literacy?
- Are teachers prepared to foster environmental literacy in their students?
- Do textbooks currently in use provide basic information for developing environmental awareness?
- How well is the school or public library stocked with materials that would foster environmental literacy?
- What environmental problems exist in the community or region today in large measure due to environmental illiteracy in the past?

Having undertaken the assessment, a report of findings with recommendations should be submitted to the school officials and released to the newspapers. Such studies will rock the ship a bit and help build both community awareness and a constituency for action.

Author Robert McClung and other Congress participants checking the ANSS Book Display.

Photo by Anne Cloutier

FINANCIAL SUPPORT

Recommendations from such studies inevitably have implied costs. Enlist the assistance of service clubs, garden clubs, and the like to fund some of the costs as a prod to get school officials to pick up their fair share. There also will have to be help from government, business and industry. This will not be easy to obtain for a majority of the forces that are most destructively and philosophically alienated from Nature are also located in these sectors. However, there are enlightened individuals there who realize that many environmentally sound ways of doing business turn out to be economically sound as well in the long run.

It is these aware individuals in the arena of government, business and industry that must be actively recruited to support efforts to achieve environmental literacy among the populace both by being spokesmen in their sector and by helping recruit funds there for programs to develop environmental literacy.

Business, industry and government should also be pressed to establish basic levels of environmental literacy as part of entry criteria for management-level positions. Such literacy would help avoid poor initial environmental decisions that cost heavily in law suits and the creation of ever more regulations. Such entry criteria would also stimulate higher education to establish that basic environmental literacy in their education programs.

NON-FORMAL GROUPS

Schools are highly artificial structures that do some educational jobs well and others quite poorly. Among those tasks that they do poorly is providing learners with strong involvement with natural systems. Schools need assistance from other institutions to provide those intense, more holistic, experiences of involvement with natural and cultural systems. This means involving non-formal groups, such as nature centers, museums, residential outdoor centers, youth organizations in designing and presenting such immersion experiences along with appropriate guided reflection. The experiences can be provided by such organizations entirely on their own, but there can be greater impact if there is a collaboration between the schools and the cultural organizations.

Environmental literacy involves some ability at decision-making. This is another area where most schools are currently inadequate: it is another area where the non-formal sector needs to

be encouraged to take a broader role through encouraging citizen participation in dealing with environmental issues through analysis of proposed alternatives and submitting of carefully considered positions, with their rationale, to appropriate decision-makers. Such activity may also be linked to continuing education courses that expand understanding of the complexity of basic principles and apply them to specific current environmental issues, thus enlarging participants' understanding. Hopefully, such courses will help people see the regional and global interconnections of an issue.

INFORMATION ACCESS

Information access is a key component for fostering environmental literacy. Currently access is limited, which makes many environmental issues fall outside a truly technological society, that is, one in which most members understand and can use the technologies of their culture, and into the realm of a technocratic society where a few have the power and responsibility for technologies that impact on everyone. If environmental literacy were widespread, all citizens would be more fully empowered to deal with the decisions and activities and impact on the planetary, life-sustaining systems.

Basically technocratic society must be founded on either a broad base of trust or suppression. Increasingly decisions have been made in business, industry, and government that have caused increasing numbers of people to abandon much or all of their trust in those institutions. People want a greater control over their technologies and this can only be accomplished through a broader understanding of their workings and limitations.

A useful tool to help gain understanding of our technologies and thus regain some potential control over them is to produce an "Environmental Consumers' Report" which would produce an ongoing set of articles on various technologies and products indicating their total impact on the environment—plus and minus. The tradeoffs would be evaluated and a net environmental impact factor assigned as a numerical guide for comparison purposes. This is very similar to the Whole Life Factor that Mike Cohen proposes in his book *Prejudice Against Nature.* He would have a numerical WLF index affixed to all products for comparison buying. The above proposal would be a transitional step in that ultimate direction.

In life, regardless of income, there are always things one just cannot afford economically. We must also learn that there are things we cannot afford ecologically. We must preserve the capacity of the planet to sustain life, human and other, over time. K. C. Gupta notes that "some consume nature to gain; but all of us must consume it to live."

HIGH ENVIRONMENTAL IMPACT CAREERS

Building environmental literacy is both a long and short range task. In the short range, every effort must be made to develop at least rudimental environmental literacy among people training for those professions with the highest potential negative environmental impact such as economists, business administrators and the like.

Part of this task could be achieved by revising undergraduate curricula and including courses that contribute to the development of environmental literacy. For liberal arts schools, revamping of the liberal studies curriculum could assure work in ecology, economics, government, human and environmental history, perhaps as an integrated core, in similar fashion to the Great Books core of the forties and fifites. The organizing concept would be Humans and the Living Planet—options, constraints, potentialities. Since liberal arts schools feed some of the high environmental impact jobs in business and industry, such a core program could have high impact on bringing environmentally literate individuals into key management positions.

TEACHER TRAINING

A major element of any strategy to foster environmental literacy in America must be the development of environmental literacy among the teaching profession. This cannot be limited to the preservice teacher training but must involve extensive inservice training. It will necessitate approaches that are qualitatively different from most inservice training for it must focus on providing experiential, immersion type situations that foster holistic preception as well as traditional analytic experiences. Teachers must have an understanding of environmental literacy in order to be effective in developing such literacy in children.

Teachers need to be regularly exposed to the instructional materials and resources available to them so that they can choose the most appropriate materials. Most teachers are almost totally unaware of the wealth of instructional materials available today to foster environmental literacy. In spite of the efforts of the ERIC system and others, such ignorance persists on a broad front. Non-formal EE groups and concerned citizens need to sponsor instructional resource fairs locally or at teacher conventions to increase awareness of such materials.

GOVERNMENT SUPPORT

A key aspect of much of these strategies is active experiences with the natural and cultural systems often through close involvement with local and regional issues. It anticipates local support but builds understandings and skills applicable around the nation. But there also must be state and federal incentives and appropriate support. Universal environmental literacy is in the national interest for our future, and it depends heavily on the manner in which we use natural resources within the constraints of natural systems. We should have a national policy statement on fostering environmental literacy and back it with educational efforts by all agencies responsible for administering natural and human resources and incentive funds to stimulate states to foster the national interest, while promoting their own as well.

As a last resort element of strategy, legislation can be promoted mandating instruction to develop environmental literacy in public elementary, secondary, and post-secondary institutions of learning. It is less critical that such legislation be passed than that it be actively debated and promoted to broaden public awareness of the need.

There is no one strategy for institutionalizing environmental literacy in our culture. It involves its own self-regulating system and the efforts of a variety of people from many walks of life. The overall battle is complex and will require long-term commitment. It is a war worth winning. I firmly believe it is accomplishable, but it will never be easy. It is likely that those who succeed us will be more aware of our successes than will we. □

SOCIAL CHANGE AND A SUSTAINABLE ENVIRONMENT FOR THE 1980S

Bunyan Bryant
School of Natural Resources, University of Michigan

America is probably the most organized society in the world; thousands of organizations mark the landscape, each championing their self-interests. Some are local and some are national in character; some have overlapping goals and objectives. Some have overlapping memberships; some are similar in their political orientation; and most work through the system. Some are primarily concerned with social justice and some with environmental issues. American democracy is made strong by the large number of groups that are capable of organizing to compete for power and self interests. Strength for social and environmental change comes from a number of groups and coalitions with similar ideology. New groups should be created where possible and old ones given strength if need be. For long-term and effective social change to come about for a sustainable future we need multiple coalitions, groups and strategies—not single ones to address complex issues of today.

The Need for More Organizations

More organizations are needed with a sound environmental ethic. With these groups will probably come organizational ideologies that extend their influence over members and non members alike and provide the context for meaningful coalitions for both a short- and long-term character. More important organizations empower individuals within them and become the mediator between individual need, government and corporate power. There is an old saying that "power corrupts." Powerlessness also corrupts as evidenced by the apathy, alienation, and often times, anger and despair found among our citizenry.

Multiple volunteer organizations have capacities to outflank traditional organizations. Environmental organizations are often able to respond faster to influence both the press and public opinion than large bureaucracies. It is negative public opinion that both government and corporations, in particular, find alarming; negative publicity threatens sales, profit margins, and loss of votes. Multiple organizations are a strength rather than a weakness. Large numbers of organizations working both collectively and independently, are seldom threatened by the demise of one or two of them. If an organization loses its leader or becomes defanged or incapacitated, this fails to prevent other organizations from carrying out stated goals and objectives. Multiple organizations are harder to control or render ineffective by adversaries. This is their strength.

Building Coalitions

Appealing to a number of groups for coalition building increases collective powers of several organizations. Often their issues are intricately tied to political economic decisions. There are a variety of labor groups and groups concerned with population, agriculture, tax resistance, human rights, animal rights and civil liberties. There are groups dedicated to providing a basic floor of protection against want and need for the elderly, and numerous consumer groups. There are gay groups, peace groups, anti-nuclear power groups, nuclear freeze groups and a variety of energy and environmental groups, all of which have potentials of becoming a part of coalitions.

Going Where the Action Is

Social science theory fails to predict precisely those conditions that give rise to organized resistance to human and natural resource exploitation. In some communities conditions seem perfect for resistance and change, but change fails to materialize. In other communities conditions are less than perfect and resistance and social change abounds. It behooves us to survey and find those communities and groups already committed to struggle. Such places as Times Beach and St. James, Missouri, Midland and Swartz Creek, Michigan, and Clifton, New Jersey, are places to facilitate the organization of people to resist those responsible for pollution and major health problems. Warren County, North Carolina would be a place to organize. Both blacks and whites protest the dumping of toxic waste claiming that the decision to dump in the predominately black area was racially motivated. There are hundreds of communities around the country that will probably explode within th next few years over dangers of pollutants that threaten health and personal lives.

Trained professionals who understand organizing principles and are knowledgeable about environmental issues, resource economics, resource management and environmental education, and people who reflect a macro-analytical perspective of the environment and how it impacts social and economic institutions, are critical in working effectively with local groups. Often working with people to encourage struggle increases their awareness and furthers their commitment for social and environmental resolve.

In many communities the insidious character of pollution makes it impossible to detect; it is frightening to be exposed to dangerous pollutants that can't be detected by the senses. By appealing to the self-interests of local community people, organizations can be built to confront decision-makers and change their management strategies so the by-product of production can be effectively managed and controlled. The emphasis is upon long-term powerful organizations to command the attention of those at the center of power. The emphasis is upon getting organizations to use protest as resource to alter policy decisions. Such protest may take on the characteristics of direct-action-nonviolent demonstrations, such as vigils, civil disobedience, conflict negotiations, and the like.

A national environmental organization willing to take on the tedious responsibility of training and sending professional organizers into communities to help local people protect their health, homes and communities will definitely make a significant contribution to the health and welfare of

the nation. Local community groups seldom have experiences or skills to adequately confront sources of power responsible for environmental despoilage. Trained professional organizers can help community groups organize themselves to find workable solutions to environmental problems. Further, organizers are to train community people to become self-sufficient to maintain long-term projected struggles.

Social and Environmental Change Via Electoral Politics

New political winds are blowing throughout black communitites. Black power is now being transferred into black political power. The wanton destruction and abolishment of social programs that took fifty years to establish, the transfer of those funds to the military industrial complex, the replacement of workers by computer-driven machines, tax breaks to the rich, hard-to-get welfare payments for the poor, tax credit to private schools, fewer federal dollars to public education, and lack of initiative or concern for school desegregation are the content of black political issues.

The victory by Harold Washington in Chicago and Wilson Goode in Philadelphia, awakened the political consciousness of blacks across the nation. Other black candidates, undoubtedly, are encouraged to run for office. Jesse Jackson, who came in third place on two straw polls behind John Glenn and Walter Mondale, was a surprise to many people—both black and white alike.

Hispanics are calling for coalitional efforts among minorities. Yet few if any minority groups are speaking directly to environmental issues and how they interrelate with social ones. Environmentalists need to show how forces that exploit the environment are the same forces that exploit human beings and relegate people to positions of powerlessness and alienation, poverty and despair. This is a chance for environmentalists to lend support to such political movements and dialogue with minority candidates on prudent uses of natural resources and the importance of healthy, natural, and social environments.

Yet to show this interrelationship is not enough. There must be a meaningful platform that clearly addresses ways of creating jobs so millions of minority and majority workers can become gainfully employed. A platform encompassing a peacetime-conversion-energy-conservation program has the potential of ensuring millions of homes and public buildings to be retrofitted for energy efficiency. An untold number of jobs for carpenters, plumbers, electricians, designers and laborers would be made available. Minority candidates cannot do it alone and they often welcome support of creative people to articulate ideas for political platforms, coalition building, and visions for a new society. A beginning of a meaningful coalition was the Aug. 27 march on Washington where multiple groups view conservative economics and social values as being root causes to multiple societal problems.

The gender gap will definitely play an important role in the 1984 elections. Today women are underpaid and more are single heads of households. The failing economy causes untold economic hardships for them as they eke out a living on low-paying and often part-time jobs or from the welfare roles. Women, who represent approximately 50 percent of the population, disagree with their male counterpart on many important political issues ranging from the environment to war. Many have decided to run for political office themselves or support those who favor ERA. They are a power to be reckoned with in the future.

The teachers of America are responding to the President's Commission on Education. The National Education Association and the American Federation of Teachers together are one of the largest organized non corporate forces in society. They know that merit pay, longer school time, federal tax breaks to private schools and prayer aren't enough to ensure quality education for all youngsters, regardless of racial origins or birthright. Teachers with their collective power can help make a significant difference in reordering the nation's priorities.

A third political party, something on the order of the Green Party in West Germany, can play an important role in U.S. politics. The Green Party raised both social, environmental, and war-related issues and captured at least twenty-five seats in the West German parliament. Both present political parties fail to integrate social, environmental, and natural resource issues in their platform or philosophy in any meaningful way. The Citizen Party is attempting to do this but only obtained less than two percent of the popular vote in the last presidential election. A strategy being talked about in the Citizen Party is to concentrate its collective effort on the State of Vermont to run a presidential campaign in 1984. Why this strategy? The Citizen Party is a new party and it is difficult to obtain ballot access in key states. Since Vermont only has three electoral votes and will

CEA's Santa Claus (Don Shedd) and two Congress delegates from Trinidad during the Lake Champlain boat excursion. Photo by Ray Pfortner

probably fail to make a difference in presidential outcomes in 1984, a Citizen Party presidential candidate running in Vermont is a way of moving social and environmental debates to the center stage.

Even though the Citizen Party is doomed to fail to win the presidential election in 1984, it can provide opportunities for people to engage each other in debates on national priorities. Citizen groups need to look at ways in which national and local priorities can be raised before electorates and how policy decision through political processes can be made.

Working in established parties to raise issues can also be effective. Or running as a local, state or national candidate not necessarily with the idea of winning, but with the idea of getting free media publicity to make known social and environmental issues. It is necessary that every opportunity be taken to increase our collective consciousness. It's a way of building grass roots political power for the future. And if some day a political party does come to power and reorder national priorities, we still need citizen groups to make sure they maintain the course, and they respond to the collective need of the many—not the few.

Personal Change:
One-to-One Relationships

Although electoral policies are important, personal changes may be even more important. A considerable amount of change comes through our contacts with people. Often people join organizations to associate with people they admire and respect. Some of us have relatives who are executives or friends on corporate boards, in civic organizations or in the church hierarchy. Some know people in union leadership positions or factory workers. Ideas travel by word of mouth through a complicated web of friends and acquaintances. This is called networking—transferring ideas and garnering support for social change activities. Social scientists claim we are a part of multiple referent groups each of which provides support and influences our values, attitude and behavior. Groups sometimes provide us with inconsistent values and often encourage people to seek information to justify certain behavior. At this time it is critical to get people involved in social change and commit a visible social change act.

Changing attitudes and getting people involved in social change activities requires that they commit a visible act. People might be encouraged to sign a petition, sing social change songs, lobby a state legislator. The act followed by rational information and by people joining organizations will most likely sustain people in an activist mode.

Professional Expertise

As environmental educators we may use our specialized knowledge outside classrooms or workplaces. Society is becoming more complex; solutions to some problems often cause other problems of a different character. Legislators hire an abundance of professionals to make sense out of scientific data to pass laws to protect the public interest. Public hearings are another mechanism used by legislators to become more informed about complex events. Also, press conferences are ways for local organizations to communicate scientific data to the public at large.

Working within well-established bureaucracy is possible. Often, we find innovative programs in traditional organizations. With skill and determination, creative programs can be established to make significant contributions to the "public good." Also, professional expertise may be used by social change organizations to inform local community groups about the danger of dioxin or other pollutants, or to confront organizations, such as the Berlin Farrow in Swartz Creek, Michigan, or Dow Chemical in Midland, Michigan, about the manufacturing and dumping practices that may cause irreparable damage to our environment and to ourselves.

Social change for a sustainable future in the 1980s is both painful and complex. There is no easy way; it takes time, commitment and there is no guarantee of success. It is often tedious and frustrating, but the stakes are too high not to challenge the automatic assumptions we make about our environment and our very lives. We can no longer depend upon the government alone to provide protection against harmful pollutants. We need to empower ourselves to help make our world more sane, healthy and just. As Frederick Douglass said, "Power concedes nothing without a demand." □

KNOW NUKES

(continued from page 39)

2. *Post Hoc* Because two events (or things) follow one another in close temporal succession the first event is claimed to be the cause of the second.

3. *Selected Instances* Support is drawn for a position by choosing only those cases or instances which back it up and disregarding those cases or instances which either contradict or do not support the position.

4. *Hasty Generalization* Arguer jumps to a general or blanket conclusion about members of a given group on the basis of an unrepresentative or insufficient number of cases.

F. **Tricks of Argument**
(Techniques of Maneuver)

1. *Appeal to Ignorance* A proposition is said to be true because it has not been disproved or is said to be untrue because it has not been proved.

2. *Leading Question* One which dictates or suggests an answer or one which incriminates the answerer.

3. *Complex Question* A series of questions are put and then the questioner demands that they be answered as a whole by either yes or no.

4. *Attacking a Straw Man* Your opponent either restates your position falsely or exaggerates the consequences that may follow your position.

5. *Victory by Definition* A position is defined in such a way as to exclude all negative cases or adverse evidence. □

MONTAUK POINT

A hundred miles at sea
scoters, loon and cormorant
  mill in December

Bird watchers on the cliffs
bulky in green down
scarves wrapped across their chins
noses running

"Must be ten thousand out there!"
the old birder roars.
He could be a Viking
looking for the bird with the great
  orange bill
pearl-gray crown

"The King Eider!" someone shouts

Maxwell Corydon Wheat, Jr.

GENERATING CREATIVITY THROUGH THE IMAGINATION

Donna L. T. Szuhy
Education Supervisor, Ohio State Department of Natural Resources

In the education field we often meet people who are considered the "movers and shakers." These are the educators who strive to develop innovative and exciting approaches to helping students learn. They are "designers." They not only recognize that learners have individual needs, skills, interests and experiences, but they design activities that address the different styles of learning and thinking. The audio learner, who grows through the written or spoken word, the visual learner, who gains information by observing and developing mental images, and the kinetic learner, who becomes physically involved with the experience, are challenged by these educators.

Before discussing a technique that can build on all styles of learning there are several points we should keep in mind when designing a meaningful learning experience:

1) Students average five or six hours per day for about 180 days per year in the classroom; that's 10% of a year.
2) Students average five hours per day in front of a television set.
3) Twenty percent of a student's year is spent with an entertaining media that can transport them to places and times they may never visit.
4) Programs for children often talk to "YOU," not "Now, Class." Individual attention is important at any age.
5) The average person who lives to be 70 years old and attends 12 years of school will spend only 2% of that life in the classroom.

We need to use innovative methods that stimulate learning, creativity and problem solving if we are to meet the needs of our students. The following technique can help us capitalize on every moment the student spends in the classroom.

Adults are often upset and concerned with children who follow their natural tendencies to daydream. Their imaginations transport them across space and time. Educators should take advantage of these active open minds by providing imaginary experiences in the out-of-doors. A few minutes of relaxation with eyes closed can take students on a no-cost field trip to a forest, pond or meadow. Using high imagery words to stimulate the students' mental screens help balance left and right brain functions. Since we think both verbally and visually, educators are responsible for designing learning experiences that excite both hemispheres of our brain.

Traditionally our society and educational system has developed activities and tests for the left side of the brain. The left controls the right side of our body and our linear, logical and rational thinking. The right side of the brain controls the left side of our body and promotes intuitive and subjective thinking. The right allows for the written or spoken word to become visual. The educational revolution toward designing meaningful learning experiences for the right side of the brain is slowly gaining momentum.

Fantasies offer an opportunity to design meaningful experiences for the right side of the brain. Stressing the observation skills and all the senses will add to the learning of any subject. Opportunities not only to visualize places and events, but to taste, touch, smell or hear can build on past experiences. The mind stores a wealth of feelings, experiences and images that can be retrieved and used to generate a no-cost field trip for the mental wanderer. Incorporating high imagery words and suggesting activities for students to do along the way will help them become more involved both physically and mentally. They will hear sounds, see colors, feel textures and smell smells. Effective descriptions can even make mouths water.

Preparing a fantasy is easiest when you start by describing a place where you have been. Most adults have hiked through a wooded area, seen a pond, relaxed in an open field or visited that rare place that makes us smile. Getting the students to travel mentally to a special place can be done by having them imagine they are walking down a narrow path, floating down a stream or even riding on a magic carpet. Sounds and sights along the way should be described using high imagery words. Experiences can be heightened by having students find an object and examine its texture, smell or color.

Set the stage for relaxed concentration by having the students sit up straight in a chair with their feet flat on the floor or by having them lie comfortably on the floor. Closing their eyes and taking a few deep breaths will help clear minds and remove tension. Speaking in a slow soothing voice will add to the relaxed atmosphere. Encourage students to listen to the words while their minds form images. Be sure to read slowly, pausing to allow images to form. To extend or build on the trip, several follow-up activities should be planned. These can include drawing things they saw or places they visited, writing descriptive sentences or paragraphs, or preparing their own fantasy. Activities such as these can release the creative juices found in all of us.

The following is a sample essay done by a student, Lorrie Kennard.

Country Roads

Picture yourself leaning against a large shade tree. It's summer, one of those hot summer days when you can feel the sun's heat prick your skin as it beams down onto you. It's a day when you don't want to venture out from under that large shade tree.

It's starting to get cloudy and a little cooler. A summer shower starts. Very slowly at first one drop at a time, as if the sky is crying. Drip...Drip...It is beginning to rain a little harder, but the water is cool and refreshing. The hot sun-baked earth soaks it up like a thirsty man would in the desert.

Come walk with me in this summer rainstorm. Join me in a slow quiet walk down a country road. Stand up slowly and stretch. Feel your body tighten as you reach for the sky. It feels good to move out from the shelter of your tree.

Cool. As you venture out look up and let the raindrops fall onto your face. Feel them gently splash your face and trickle off. They are cool. Taste their wetness.

Ahead of you is a one lane road. The forest touches its edges. All trees branch out and almost completely cover the sky above the road. They act like an umbrella sheltering out the raindrops. You still hear and smell the rain around you. The trees make you feel snug and safe.

As you walk feel your body move. Feel its grace. It moves without even thinking. Be aware of it. Your muscles and bones are moving you slowly down the road.

Feel the gravel under your feet. Listen to the sounds it makes. Feel the air against your skin. It is cool. Listen, the rain has stopped and the forest creatures are starting to venture out. Birds are beginning to sing loud and clear. They sound so happy. Listen to the wet leaves drip. Look at everything...everything seems fresh and alive.

Ahead of you the trees aren't as big and a sunbeam breaks through causing mini-rainbows in the light mist rising from the road. As you walk into the light you feel the sun's warmth and the coolness of the steam rising. To your surprise two deer are ahead of you drinking from a water puddle. You see them as they see you and you feel the excitement in both of you as they jump into the woods. You feel happy and peaceful bursting with life as you start home . □

A State Studies Approach to Teaching People About Their Environment

Dean Bennett, *University of Maine at Farmington*

This workshop demonstrated how studies of one's state can develop historical, present, and future perspectives concerning the interrelationships between people and their environment. Right and left brain techniques were demonstrated from the new Maine Studies Program on Science and Natural History. The focus of the program is a sourcebook for K-12 science teachers and interpretive naturalists. Designed specifically to strengthen the teaching of science, the book is the product of a four year effort involving scientists, naturalists, students, and over 350 science teachers.

The sourcebook is published in four volumes (sturdy 3-ring binders) containing a total of 38 units on land, water, atmosphere and weather, plants, animals, energy, natural ecosystems, urban areas, unusual and rare features, and problems and issues. Each unit contains: (1) background information written by an expert in the field, (2) inquiry activities, (3) maps, (4) photos, (5) worksheets, (6) small group activities, (7) outdoor teaching techniques, (8) field trips, and (9) instructional resources. Although the sourcebook is oriented to Maine, it contains a wealth of information and activities of interest to teachers anywhere.

Volume I, the foundation volume for the series, covering the physical sciences, principally energy units and activities, is currently available from the publisher, Down East Books, P.O. Box 679, Camden, ME 04843. Cost $29.95 plus postage. Volume II, the earth sciences, is also now available at the same price. Volume III, life sciences, and Volume IV, ecological sciences, are scheduled to be available June, 1984.

The workshop presented a variation of the following activity which is an excellent small group experience utilizing both verbal and visual skills. It also is very effective in relating science to language arts and art.

Activity:
Four Days in the Life of a Bullfrog

Middle and Upper Levels
Objective:

Working in four groups, the students will depict their assigned stage of the bullfrog's development by creating a round-robin story and drawing pictures on write-on slides of the bullfrog in its stage of development. The slides will be shown along with the reading of the students' sentences. This activity correlates science, language arts, and art.

Materials

– Kodak Ektagraphic Write-on Slides 38 x 38mm, CAT 101 1113, Carton of 100, available from photographic supply dealers,
– Pencils or fiber-tip pens and handouts with background information

Description

Divide the class into four groups. Have a quick review of a handout on the life cycle of the bullfrog and the round-robin story technique. Assign the four stages of the life cycle: egg, tadpole, froglet, and adult frog—one to each group.

Set mood with the following directions to the students: Put yourself in the role of the bullfrog at your stage in development. Using the round-robin story technique, come up with a story on a typical day in the life of an egg, a tadpole, a froglet, and an adult frog. Try to use some of the information from your handouts. When you finish, draw a picture on the write-on slide (draw on the dull side) depicting your sentence.

While the students are working on the story, hand out the slides and pencils or pens. Collect the slides in the order of the stages and place them in the slide projector.

Starting with the egg group, show the slides simultaneously with the students' sentences. Have a group member read the portions of the story developed by the group.

Source

(Adapted from an activity developed by Kate Greeley, student at the University of Maine at Farmington. Edited by Dean B. Bennett.) □

INDUSTRY/ENVIRONMENT PARTNERSHIPS

Moderator:
Walter Purdy, *Manager, Educational Services, Edison Electric Institute*
Panel:
Richard Leonard, *Coordinator, Educational Services, New York Power Pool*
Kurt Anderson, *Manager, Environmental Affairs*
Empire State Electric Research Corporation
Richard Gallagher, *Nuclear Information Representative*
Northeast Utilities, Millstone Energy Center

What are some of the courses of action that electric utilities have undertaken to address the environmental problems facing our society? In an effort to answer this question, this workshop looked at the cooperative industry/education research, specific programs and education activities that focus directly on these important issues.

Walter Purdy, Edison Electric Institute (EEI), opened the workshop by showing a segment of one of the four films with environmental themes that have been produced under a grant from EEI. The 16mm films are in color and run approximately 27 minutes. The titles are: *Silver Wires, Golden Wings,* which deals with the extensive efforts to save the eagles of the West; *A Second Chance,* a film that explores a wide variety of endangered plant, animal and sea life; *The Chosen Place,* a film that dramatizes how wildlife takes advantage and benefits from the environments created by modern technologies; and *To Catch a Cloud,* which details the extensive research that is taking place dealing with acid precipitation. All of these films are available for free loan from Modern Talking Picture Service, 5000 Park Street North, St. Petersburg, FL 33709.

Richard Leonard described the joint New York State Department of Education/New York State Electric Utilities education project. The Department of Education developed a solar project under a federal grant. After it was completed, there were no funds to implement the program. The seven investor-owned electric utilities and the New York Power Pool agreed to provide almost $1,000,000 over the next three years for materials, in-service and other necessary activities. The educational representatives of the utilities are working closely with the personnel of the State Department and the school districts. More information can be received by writing to: Educational Services, New York Power Pool, 3980 Carman Road, Schenectady, New York 12303.

Kurt Anderson, who has a long background in academic, government and industry sectors, provided extensive insight into the questions surrounding acid rain. He noted that the electric utilities have accelerated their efforts to research and solve the problems surrounding acid rain. He discussed the research efforts of the Electric Power Research Institute (EPRI), 3412 Hillview Avenue, Palo Alto, CA 94303, and suggested that interested persons write to EPRI for more detailed information about the national acid rain research projects.

Richard Gallagher, a former teacher with a graduate degree in environmental studies, outlined an assortment of ways that a power plant site can fit into and assist in improving the environment for plants, animals and marine life. His slides demonstrated how the Millstone power plant has become an ally of the environment of Connecticut and Long Island Sound. He gave specific examples of other locations where the utilities have joined together with the people of the community in varied cooperative activities to improve environment. He urged the audience to get involved in these cooperative efforts in their own communities. □

PUTTING CONCEPTUAL MEAT INTO AN ENVIRONMENTAL EXPERIENCE

V. N. Rockcastle, *Cornell University*

Two years ago I was a participant in an environmental education conference where "acclimatization" happened to be the focus of the day. As one of the activities, a group of a dozen or so of us were asked to cross a deadly swamp, using planks on which to stand. This required that we huddle tightly together on one plank, while laying down the next. Recognizing the socially congealing nature of the activity, but wondering what else the leader had in mind, I asked, "What was the purpose of this activity?"

"To cross the swamp," was the reply.

"Yes, but what objective did you have in mind when you brought us into this activity?" I continued.

"To see if you could cross the swamp," again was the reply.

"Was that all?" I persisted.

"Yeah. Wasn't that a fun and profitable activity?" came the rejoinder.

This bothered me. It bothered me from several standpoints. First, there *were* socially desirable objectives in getting us tightly together on the plank. We got to *know* each other. We *touched* each other. We *depended* upon each other. We learned first and last names, home bases, and interests. And we learned that through cooperation we could cross a "dangerous swamp." But we could have learned much more. We *should* have learned much more!

Environmental education has been for some years, it seems to me, primarily an affective movement. It has focussed on sensitivity (whatever that is), understanding (whatever that is), and sympathy (whatever that is), mostly in regard to our plant and animal surroundings. Seldom does it involve the physical interactions in our environment, and even less often does it involve quantitative investigations of basic principles in these interactions.

My thesis is that we must get more cognitive mileage from environmental education programs; we do not have *time* to waste on environmental fun and games. Some aspects of environmental education "programs" remind me of chiffon pie—looks nice, but there's little susbstance once one takes a bite. An examination of the program of most environmental education conferences of today may show items such as the following:

Snowshoeing
Making taxidermic mounts
Soups from roots and herbs
Banding butterflies (or birds)
Making your compost pile work
A visit to the canal museum
Environmenal songs and dances
Cooking with a reflector oven
Design and use of wood-burning stoves

These are undoubtedly fun and popular. But after the conference, what do most of the participants do? They return to a life that does *not* deal with compost piles, herbal soups, or cooking in a reflector oven. Instead, life for most environmental conference participants relates to driving in a car (and thus closing car doors frequently), living and working in buildings with piped-in and fossil-fuel-heated water, and learning more of motorcycles, jet planes, autos, telephones and TV sets than of birds and insects. If all this be so, then what kind of conceptual meat *should* there be in an environmental education conference?

First of all, I suggest that here *is* a body of knowldge—of general utility and understanding—to which the educated person should be exposed, should internalize, and should call upon frequently. This body of conceptual knowledge includes some basic principles of both biological and physical science. Some examples from biological science are:

1. *With some possible rare exceptions, all living things come from other living things of the same kind.*

I doubt that many children, and probably not very many adults, have observed the complete life cycle of an organism, noting how mature organisms produce new offspring, how these, in turn, develop into mature individuals very much like the one from which they came, and how each of these new adults can be party to still more new organisms. How great it would be if each person under our direction had the experience of nurturing some organism from egg to adult to egg again!

Final deliberations of the assembled Burlington Environmental Congress, University of Vermont, August 1983.

Photo by Ray Pfortner

2. *A life cycle is not a 2-dimensional circle, but is spiral, with the third dimension being one of* time, *and thus results in perceptible or imperceptible change.*

I have yet to see a textbook or chart that shows a life-cycle to be anything but a circle. Is it any wonder that the concept of change with time, of the imperceptible yet inexorable development of new varieties or sub-species, seems only a figment of certain scientists' imaginations, when all the biology textbooks show identities in life cycles?

3. *Competition among living things is universal—for food, for living space, and for light (in green plants). Each species and individual has a peculiar ability to survive limits in one or more of its needs, but each may succumb at a different limit of a combination of them.*

We hear about the tough time American beeches are having today, and we have witnessed the demise of the American chestnut and the American elm—tragedies both. But are we not also witnessing something of the natural forces of selection pressure and evolution at work in the human-speeded production of H-strains of the pathogen that effectively reduce or eliminate the virulence of the V-strains? At the same time that we engage in heroic efforts to save certain species, aren't we also witnessing an evolution that is part and parcel of our living (and dying) world? Is that concept a part of our environmental education programs, and if not, shouldn't it be?

4. *Just as the slightest traces of certain substances or elements are important in the function of a computer chip, so are they in the function of an organism as complex as a human, or a bird of prey.*

We hear about the importance of Na^+ ions in our circulatory physiology. We know about the importance of small quantities of DDT in food chains, and what they can do when accumulating in birds of prey: it makes shells too thin for normal hatches, and the population declines. But are we sensitive to dilutions of other substances—perhaps highway salt in the groundwater, or additives in food and in gasoline? Have we experienced directly, or measured meaningfully, some dilutions so that we are personally convinced of their importance, and thus willingly take steps to change our actions and our frames of reference to further diminish even trace amounts of detrimental substances?

I wonder, for example, what it means to most of us to "wash away all traces" of something. I wonder what the concept of "away" encompasses for most people? When you wash it away, or flush it away, or sand it off, or rinse it

out, even "dispose of it properly" as the admonition on some containers goes, is it really gone, and if so...*where?* Isn't "away" simply in someone else's back yard? Do we *teach* this in our programs?

5. *Most of life as we know it exists in a layer comprising only a small fraction of Earth's atmosphere, water, and soil. Our raw materials for living, our social activity, and our waste are all concentrated in this thin layer.*

We stand at the bottom of what seems to be a "topless" sea of air, when in fact half of all the atmosphere is below about 18,000 feet! I can well remember the impact that a descent into the murky air of New York City had upon me when I approached it about 25,000 feet from Montreal. Not only was I going to descend into that stuff, I was going to *live* there! I have felt the same anxiety flying into Phoenix, Los Angeles, Roanoke, Chicago, Denver, and Syracuse. It is a hallmark of modern life, our continued pouring of metabolic sludge into our life-support systems, yet we spend little determined, planned effort on education for conceptual understanding about it. We seem to prefer sensitivity sessions and sympathy seminars. Some concomitant cognitive conditioning might be better medicine!

These are a few of the major biological concepts that I think have important environmental connotations. There are many more upon which I think we could agree. And there are also some important physical science concepts as well. These are perhaps even more slighted than are the biological science ones. Some examples of them are:

1. F=Ma, or the force needed to accelerate an object is proportional to the mass of the object, and to its acceleration. This is true both in a posiive and in a negative sense (both in speeding and in slowing).

Imagine two cars at a stoplight. One is an American-made mid-size car weighing about 3,000 pounds. The other is a compact, weighing about 1,500 pounds. The light changes, and both cars accelerate at the same rate, only to find themselves stopped by another light down the street. The force that the twice-as-massive car needs to accelerate is *twice* the gasoline consumption during the acceleration. It takes *twice* the fuel to move the twice-as-massive car uphill, *twice* the energy to stop it. No matter how you slice it, *F=Ma!* If we really concentrated on that concept while we have our fun and games, our environmental education programs might make more of a mark on modern society.

Or consider something as mundane as a congregation sitting down on the pews after a hymn. The pews are unpadded, and so each parishioner comes to rest on a polished oak seat. He or she is cushioned, and thus decelerated, only by his or her gluteus. So the bodies (each with an average weight of about 125 pounds) must decelerate from a downward speed of perhaps 1 foot per second to zero in the distance of about an inch. Decelerating that massive a set of bodies in a distance of one inch puts a tremendous force on the seats, and hence on the beams of the floor.

Now consider padding the seats with, say, the equivalent of two inches of foam that compresses to less than half an inch when the congregation is seated. Now the deceleration takes place through 2½ inches instead of one inch. Less force is required, and the stress on the floor timbers is less as a result. A simple relationship of *F=Ma* being brought home through applied understanding!

Or consider the water in the pipes that supply your rooms. Water is for all practical purposes incompressible. That means when you turn on the water, a column of water from the faucet all the way back to the source moves. The mass of this column is considerable. A faucet turned on all the way permits a fairly high speed for this water. Now think what happens when the faucet is turned off suddenly—instantaneously, for example. In an instant, that entire column of water is brought to a grinding halt. And being incompressible, there is no springiness or "take-up"; the pressure *zooms* for a split second. Perhaps enough to split the pipe, or at least find the weakest spot, and squirt out!

On the other hand, picture the faucet being turned off in something *more* than a split second—a half-second, perhaps. The water is brought to a halt more gently. The force within the pipe rises only slightly higher than normal, and no leaks occur. A knowledge of *F=Ma,* and some conceptual understanding of compressibility and of force and pressure, combine to put less stress on the system, make it last longer, and thus do less environmental detriment.

2. Force = pressure x area, or the force on a surface equals the pressure times the area on which that pressure is applied.

Some students—unknowledgeable or unthinking, or both—were bicycling around the university track, which has been newly resurfaced. When told that they should not be biking there, that their tires would do considerable damage to the track, they became insolent. People ran on the track. Why should bicycles do any more damage than running shoes?

3. v=fA or the velocity of a wave equals the frequency of the wave or vibration times its wavelength.

There are many environmental phenomena involving sound and light which this relationship helps to explain. One simple example might be the hum of a mosquito or a gnat. Imagine that you are disturbed in your sleep by one of these critters, keep slapping and fanning to no avail, and then remember that you might as well do a simple investigation, since you are now wide awake. You hum the note of the insect, and go to the nearest piano. There, you explore for the key that is nearest the note you are humming, and finding it, use the numbers below to determine the oscillation rate of the insect's wings. Approximate vibrations per second:

Middle C = 262
D = 294
E = 330
F = 349
G = 392
A = 440
B = 494

Every higher octave is double the same note below it. If you found C above middle C, for example, the wings would be beating an incredible 512 times per second!

And since the insect just might have followed you out of the bedroom to the room with the piano, you now beat a hasty retreat back to bed, relaxed and happy in the knowledge that the insect is no longer your roommate, and that you have found its wing-beat.

Or consider the colors one often sees in soap bubbles, oil films on a wet road, and the clear wings of some Hymenoptera and Diptera. When the upper and lower surfaces of a membrane (or a thin sheet of oil) are not the same distance apart (as when the oil is spreading from a slightly thicker center toward the thin edges), there is an interference of light that reflects from the upper surface, and that which

reflects from the lower surface and passes up through the material. This results in effectively cancelling out certain wave-lengths of light, while permitting others to pass through. As the thickness of the membrane or film changes, different wave-lengths are interferred with, until the film or membrane is of absolutely uniform thickness. Then it becomes one color, since the interference no longer changes. Seeing this, and understanding why it happens must be more pleasing and satisfying than not seeing it at all, or seeing and not knowing. Utility? Not much, perhaps. But what is the *utility* of knowing the difference between water of guttation and dew? Yet that *knowledge* makes my environment a better place to live.

There are so many other things associated with a basic *knowledge* of waves and wave generation, from the energy required of a firefly to the resonance needed to tune TV or radio, of FM and AM, simple and mundane occurrences such as squeaks, the apparent out-of-tune effect in two sections of a band marching in opposite directions produces, and the apparent drop in pitch of a passing car horn.

There *is* a need for sympathy, for sensitivity, and for understanding in environmental education. But that need can best be met through a concerted effort to build a solid conceptual base. When affective elements are solidly rooted in conceptual meat, they have a much better chance of resulting in behavioral change.

How, precisely, would one go about implementing a teaching strategy that involves both conceptual meat and environmental sensitivity? Let's look at a lesson on animal tracks that has built into it conceptual meat on force and pressure. To involve children at the outset, they are asked to trace their feet on squared paper, and find the area of both feet. Then they step on a scales and find their weight. They write their weight *over* their feet (force over area) because their weight *rests* on their feet. This is reduced to a simple decimal or fraction.

Then they find the area of an animal track such as a deer, using the same units of area. The weight usually has to be given—about 175 pounds or 80 kilograms. When reduced to a simple decimal or fraction, a deer's *sink-in-the-snow coefficient* is found to be several times that of a human. And a deer *does* sink in the snow several times as far as a person.

Next, children can apply this to the track of a snowshoe hare, whose feet are huge compared to is weight. Its *sink-in-the-snow coefficient* may be only 1/10th that of a human, and 1/50th that of a deer. Extending this concept still further, one might measure the area of a car tire when it presses against the pavement, then take the pressure with a tire gauge. Multiplying one tire's press-against-the-pavement coefficient (tire pressure) by the area on which that coefficient (pressure) works, one finds the force or weight on that tire. Doing this for each wheel, in turn, and adding them up will give the total weight of the car. Finding the weight of a vehicle by means of a ruler and a tire gauge is simply applying the relationship between force, pressure, and area. It is also seeing in that relationship that the larger the area, the greater the force; or the greater the pressure, the greater the force; or that if the area is big enough (such as the wall of a building), even a modest pressure (as in a wind-storm) could exert a tremendous force (enough to topple the wall!).

Now back to the fun-and-games aspect of an earlier environmental conference. Crossing the dangerous swamp on a plank could have had a two-fold reward: (1) socializing and developing group awareness, and (2) learning some conceptual meat about force and pressure. The plank we stood on was about 1 foot by 8 feet. There were ten of us trying to crowd onto that one plank. If each of us weighed 150 pounds, we would have totalled 1,500 pounds. We would have been crowded onto an area of 8 square feet, making 187½ pounds per square foot. We didn't take the time to find the area of our feet, but I think that on the plank, massive as our load appeared, we exerted less pressure on the ground than we did by simply standing. With a scale and some squared paper, we could have found out. At least, we could have learned about force and pressure, and perhaps even about snowshoes and rug coasters.

Additional activities carried out in this workshop will appear in future journals. □

SONNET

Down steep hairpin turns we found
the river
One sultry West Virginia afternoon.
The children stripped, then tensing
for a shiver
Stepped tiptoe in the water
dancing sun.
We found the warmth and downstream
pull surprising
And let the current lure us further in,
Then slithering deeper, clinging,
water rising,
Our son turned round submerged
up to his grin.
We undulated with the river's flowing,
Water smoothing curves of bodies,
stones –
Hair drifting, algae – then a
sudden knowing
That blood, not water, flows around
our bones.
I quickly brought them back
to shore and air
But stooped to smell the river
in their hair.

Ruth Yarrow

The Montpelier Environmental Education Program

Douglas Sherry
Montpelier Elementary School, 1 Park Ave., Montpelier, VT

What happens when five people, of different backgrounds, are brought together and asked to develop an Environmental Education program for 900 students in grades 1-6? This was the case nine years ago in the Montpelier, VT Elementary School. The program that has developed over the last nine years is the result of students, teachers, administrators, parents and MEEP (Montpelier Environmental Education Program) staff working together to develop a truly unique Environmental Education program.

Because of the varied backgrounds of the original staff, the program was established on the philosophy that environmental education was meant to educate students about the world around them, both natural and human. Each student was to have MEEP class through the whole year and the Montpelier community became the classroom. Teaching methods and techniques were to be those best suited to the activities being developed.

In 1981 a 300 page Curriculum Guide was published by the MEEP staff in conjunction with the Vermont Department of Education. This Guide describes the history of the program and contains 18 representative units for grades 1-6. It is available, at cost, from the Montpelier Environmental Education Program, 1 Park Ave., Montpelier, VT 05602.

One of our popular units, which we developed for second grade, is *Basic Needs of Wild Animals*. The introduction and some of the activities appear here with the hope that they will be used and expanded on by others.

BASIC NEEDS OF WILD ANIMALS

Introduction

Children of all ages seem to be fascinated by animals. However, the misconceptions and false impressions children have about animals need to be corrected. Activities in this unit have been designed to provide students with factual information regarding the animals of their state.

Teachers can do a great deal to help students see the relationships between animals. For example, most primary students learn to group objects that are alike together. This concept can be applied to animal groups by discussing the similar characteristics of animals and helping students to group mammals, reptiles, fish, birds, amphibians, insects, etc.

Most children love to learn about animals, and once the discussions start, there is no way to tell what topics they will want to know more about.

Activities

1. *Basic Needs of Wild Animals*

Materials: Mounted (stuffed) animal or pictures of animals common to your area.

Procedure: When beginning a discussion of the basic needs of wild animals, bring into class a mounted animal, if possible. These sometimes may be borrowed from a local taxidermist, museum or fish and game department. If unavailable, use pictures of wild animals. Discuss some of the basic needs of that specific animal, and then generalize to all animals. It is important for children to learn the animals native to their area, so talk primarily about the wild animals of your state.

2. *Animal "Hunt"*

Materials: Old copies of *Ranger Rick, National Wildlife,* or *Audubon.*

Procedure: Using old copies of *Ranger Rick, National Wildlife,* or *Audubon,* have students hunt through and pick out one animal they would like to talk about. Have each student try to tell the group where the animal lives, what it eats, how it protects itself, and what, if any, special adaptations it has.

3. *Animal Homes*

Materials: Sheet with animal outlines, 12" x 18" manila paper and black paper, scissors, crayons, glue or paste, books with pictures of animal homes.

Procedure: To reinforce the students' understanding of where different animals live, make a dittoed sheet of animal pictures—squirrel, beaver, bear, birds, raccoon, woodchuck, etc. The students can color these animals and cut them out. Have each student draw on a 12" x 18" sheet of manila paper a scene showing where six or eight of these animals would live. For example, they might show a large cave for the bear, a tree with a hole in it for the raccoon, a nest for a squirrel, and field with a burrow for the woodchuck. After drawing these homes, you can make them "open up" by cutting, for example, the opening to the cave so that it opens and shows the bear sleeping inside. To do this, back the manila paper with a sheet of black paper the same size. The animals can then be attached to the black paper.

After completing this, the students can draw the animals' tracks leading to the entrances of their homes. Others can then guess what animal may be hiding inside. By opening the little door, they can tell if they were right!

RESOURCES

Books and Articles for Children:

Alexander, Martha. *No Ducks in Our Bathtub.* New York: Dial Press, 1973.

Jeffers, Susan (adapted from Mother Goose). *Three Jovial Huntsmen.* Englewood Cliffs: Bradbury Press, 1973.

Lapp, Eleanor J. *The Mice Came in Early This Year.* Chicago: Albert Whitman and Company, 1976.

McClung, Robert M. *How Animals Hide.* Washington, D.C.: National Geographic Society, 1973.

Merriam, Eve. *Small Fry.* New York: Alfred A. Knopf, 1965.

Phillips, Lois Brandt. "Little Porkey on His Own." *Ranger Rick's Nature Magazine.* May 1977, pp. 35-37.

Ross, Wilda. *Can You Find the Animals?* New York: Coward, McCann and Geoghegan, Inc., 1974.

Selsam, Millicent E. *When An Animal Grows.* New York: Harper and Row, 1966.

Steiner, Jorg. *The Bear Who Wanted To Be A Bear.* New: Atheneum, 1976.

——. *Hidden Animals.* New York: Harper and Row, 1969. □

GLOBAL ENVIRONMENTAL EDUCATION: A WAY OF THINKING AND ACTING

Lori D. Mann and William B. Stapp

Bill Stapp during his Practioners Session **Photo by Ray Pfortner**

It is almost a cliche to speak of the world growing smaller each day. We tire of hearing the phrase, yet the meaning of this concept frequently escapes us. Our ties have moved far beyond hereditary and cultural bonds, past telecommunications and transcontinental travel. This planet is now a delicate weave of beliefs, customs, patterns, and actions.

There is no independence. Each individual and nation is a part of this intricate weave. We are linked geographically, historically, ecologically, economically, politically, religiously, socially, and in countless other ways. Viewing the world in this fashion, it is a tapestry of great hope, a vision bound in unity, understanding and respect.

Progress toward the solutions to complex problems and issues (such as world hunger, desertification, acid rain, nuclear proliferation and peace) is enhanced through cultural awareness and understanding, the international exchange of ideas and information, and actions that represent holistic thinking. We need to see the world in its global context and, as educators, to assist citizens and legislators to act with a global perspective in mind.

Common Interests

The most fundamental, most critical knowledge that global environmental educators can impart is that all of us—Americans, Chileans, Kenyans, Iranians, Italians, Russians—live together in a single human ecosystem. We share common interests, common resources, and a common destiny. It is an ecosystem in which individual actions can have pervasive repercussions, yet a world in which we sometimes act in ignorance of the countless impacts we are having. Virtually no decision is simple: each morning cup of coffee affects bean growers in Brazil; fertilizing lawns contributes to world hunger by limiting the capacity to produce crops in countries (mostly developing nations) where soil quality is poor; even each plastic bag we purchase touches the worldwide demand for petroleum and weights the always tenuous balance maintained between the oil-rich and oil-needy countries. Americans, in particular, have a great effect on the world environment as we use 36% of its resources, yet house only 6% of its population. Thus, we have an express responsibility to increase our sensitivity to global concerns.

Despite our understanding of these facts, we make many decisions considering only how they affect ourselves, our immediate environment, or one nation. It seems that the worldwide implications of acid rain, destruction of the tropical rain forests, and pollution of the oceans should indicate the far-reaching economic, environmental, political and social impacts of our daily choices. No political decisions, no long-standing national boundaries, no laws can contain such repercussions. Yet, the link between these problems and our own local actions frequently go unnoted.

It is at the personal level that results are most obvious; positive actions are felt directly at this level, and consequences are most immediate. Though less apparent, local actions and personal decisions do indeed have global ramifications. Collectively, our individual actions have far-reaching effects. Nurturing an understandig of this fact can develop within individuals a comprehensive view of the world environment while simultaneously establishing their own place in bringing about solutions to current problems. Problem solving is not the sole realm of politicians and bureaucratic heads; individuals and community groups also have a vital role. By bringing situations to people's attention in a manner that illustrates how their own daily patterns set off reactions around the world, they can become motivated to understand and act upon issues in a positive manner. This is a shared responsibility among all world citizens that can be ignited through effective global environmental education.

With this in mind, a primary goal of education grows clear. At least in part through global environmental education, educators should help foster in people a comprehensive understanding of the earth. We have the opportunity to build a world of concerned people with the knowledge that local actions and personal decisions do affect others on the planet earth—both positively and negatively—and that each individual therefore has a role in creating solutions for environmental, political and social problems. Equally important, people must also develop the ability and inclination to act upon this knowledge, to form a lifestyle that

manifests this understanding, commitment and concern.

With the need for such thinking so clear, and the stakes of failure so high, why is it that global perspectives are not better integrated into today's educational efforts? The barriers are many and strong. In an address before the National Association for Foreign Student Affairs in Washington, D.C. on May 8, 1975, Stephen K. Bailey, Vice President and Director, International Education Project, American Council on Education, pointed out some significant facts illustrating the results of these barriers to effective global education in the United States. These data are six years old and current percentages are not available. In most cases, though, even optimistic growth rates of 100 and 200 percent leave staggering deficiencies:

- Only 3% of all undergraduate students, less than 1% of the college-aged group in the United States, have enrolled in any courses which deal with international events or discuss in any way foreign peoples and cultures.
- In 1973, a survey conducted by the American Association of Colleges of Teacher Education reveals that barely 5% of the teachers being trained have any exposure at all to international content or perspectives in their coursework for teacher certification.
- The current average newspaper coverage of international events which is read by the general public equals no more than one-half of one column of newsprint per day. Virtually none of the newspapers in the United States has foreign affairs reporters on the payroll. Fewer than twenty-four have any staff specialists in the area of foreign affairs.
- Notable imbalances characterize the nature of expertise among international specialists. Here are some disquieting facts: Over 100 million persons speak each of these major world languages: Arabic, Bengali, Chinese, French, German, Hindi, Indonesian, Japanese, Portuguese, Russian, Spanish, Swahili and Urdu. In at least half of these languages, the number of Americans expertly trained is fewer than 50: Middle Eastern language enrollments in the U.S. draw only about 1,300 per year. All but a handful of these students drop by the wayside before they become truly proficient in the language being studied.
- Television coverage of world affairs is largely episodic, dramatic, and transient—although impressive exceptions must be acknowledged.

Wrong Emphasis

The barriers to bridging these gaps and helping individuals to develop a unified vision of the world environment occur pervasively. One obstacle lies in the tendency of educational efforts in all arenas to emphasize differences rather than similarities. Many social studies programs that currently exist in all grade levels, for instance, deal pointedly with the ways in which other cultures differ from our own. Through community groups, media, news reporting, schools and universities, we teach primarily of "our" resources and "their" resources. Materials often lack a sense of world oneness. As a result, educators often do not stress connections, commonalities, and mutual respect. Rather, they promote a feeling of separation. Many notable exceptions do emphasize the interdependence of world resources and the societies which depend on them, and it is such programs that aid educators in incorporating a global perspective into their efforts.

Other constraints are not so easily recognized. They are of cultural, political, and social derivation, and present deep-rooted obstacles that sometimes seem insurmountable. However, they can all be overcome with conscious and persistent effort.

Conceptual lag is a quiet but influential force in carrying on traditional ideas and delaying the incorporation of new thoughts into a common frame of reference. Ideas and values are molded by past experience and actions follow accordingly. Compounding this lag is the perpetuation of these deepy-imbedded values through reinforcement by government, schools, and other social institutions. It therefore takes time for the united views promoted by global environmental education to catch on, and even longer for individuals to change their daily patterns to reflect this growth.

Some political attitudes that have become prevalent in recent decades hinder incorporating a world-oriented outlook into our educational systems. As a nation, America appears to be caught up in its own world; we seem to strive for independence on a planet comprised of intricate linkages. Though a compassionate people, and a country willing to give generously in the name of humanity, it is sometimes difficult for us to look beyond our own boundaries with a continual interest or concern for people and places beyond our immediate range. This is partially due to our physical separation from most other countries and our wealth of resources.

Political ideologies, language differences, and the quest for power often lead us to put national interest above global issues. We are rightfully concerned with the protection and promotion of our own country's interests. However, national pride can also impede our view of our role as a global influence. The mistaken equating of nationalism with patriotism may hamper the move toward global environmental education. There is much evidence of increasing acceptance of cultural and political ideologies other than our own and of a greater understanding of the oneness of the world, but there is need for much growth in this area.

Cultural Barriers

A general feeling of egocentricity in our culture further bars ready acceptance of global perspectives in that it has created a concern for the immediate and the tangible. Environmental consequences, in particular, do not meet this description. It would be far easier to make environmentally sound decisions if the probable effects were known at the time a choice is made. But, more often than not, it takes many years for slow-building consequences to reach visible proportions. Much damage is done long before there is any concrete evidence. It is difficult, too, to base decisions on impacts felt half a world away. In the United States, we are fortunate to be living in a geographic region that is resource rich. This makes it more difficult for us to imagine the strains of nations that simply do not have our good fortune. Although a problem like the destruction of tropical rain forests is very real, and does indeed impact our own lives through the lives of others, it is easy for us to ignore this problem since we may not realize its direct effects. Thus, it is essential that we find ways of illustrating our connections to these situations, of bringing them closer to home, both in terms of how our actions cause such problems and how they affect our own lives.

Barriers such as these are deeply rooted and difficult to master. Overcoming them is a large, seemingly insurmountable task, but building a global perspective into virtually all

existing daily patterns is an essential part of refueling our spirits and finding solutions to world problems. Slowly, changes in attitudes are being cultivated. An increased sensitivity to other countries, facilitated in part by faster and cheaper intercontinental travel, cultural exchange programs in schools as well as between nations, and a growing interest in tracing heritages, is creating a more culturally-bound globe. Educational efforts are expanding their foci; we are beginning to recognize the common resources and common needs that tie us together.

The strategies for breaking down the well-built obstacles to global environmental education are varied: changing university requirements to include an emphasis on current world affairs; integrating international information and perspectives into existing courses, increasing language requirements in public schools and universities, and stressing similarities between people in all countries at every available opportunity are but a few of the ways of generating increased respect and understanding for the connectedness of the planet and enabling people to act on that knowledge.

Global E.E.

Much is occurring internationally to promote global environmental education. United Nations conferences on a wide range of topics such as desertification, population, energy, pesticides and resource development are acknowledging the importance of education as an integral part of finding solutions to world environmental problems. Also, over the past decade an exciting series of regional meetings sponsored by the United Nations have focused directly on the development of worldwide strategies and action programs designed to further environmental education in all sectors of the world.

These programs are making invaluable contributions to the growth of global perspectives in environmental education. They are bringing about significant changes in the quality of the world environment. However, such programs operate on a very large scale, and can appear irrelevant to some individuals. It is the task of the global environmental educator to find ways of scaling such ideas on a level that is tangible to each world citizen.

One of the most significant strategies for bringing this about is in linking personal, local actions to their positive and negative global implications. Dissecting the overwhelming issues facing the world today, and bringing them to a level that has direct pertinence to the individual is a potentially powerful method of nurturing a global environmental ethic in each person. Helping people to realize that their own actions compound to create or counter global problems can only accelerate their solutions.

An important component of increasing our awareness of linkages between local actions and global impacts is to build an understanding of the cultural oneness of the world. Looking at the subcultures that exist within our own country is an effective way of doing this. Educators should take advantage of the educational potential of their own city's ethnicity—through festivals, dances, restaurants, interviews, and guest speakers—to help people develop an acceptance of perspectives that differ from their own.

Almost every area of our lives can be linked in some way to global effects; the repercussions of virtually every decision can be felt worldwide. Our food choices, for instance, have implications of universal concern: fresh produce saves resources (energy and otherwise) that go into processing and packaging canned or frozen fruits and vegetables. Locally grown produce does not require the incredible amounts of fuel devoted to cross-country and international shipments; vegetarian sources of protein (beans and nuts) generally use one-third the energy required to raise and market beef cattle. Our food purchases, therefore, are intricately tied to world energy supplies. Each individual can contribute, albeit on a small level, to energy conservation by making informed food choices that support these environmentally sound concepts.

Daily Decisions

Similar repercussions can be felt with respect to decisions we make regarding transportation. The United States is the most car-dependent nation in the world, and the automobile industry is certainly a significant portion of our economy. The "globalness" of the industry, though, is often overlooked! We depend on raw materials imported from five continents to produce a single automobile; local transportation decisions (big car, small car, bus or bicycle) impact the global environment (emissions, fuel demands, resource use); transportation patterns in other parts of the world are structured on a much broader base than our own. We need to know the ways in which other countries cope with transportation problems we are now facing. There is much to be learned from looking beyond our own boundaries for solutions to a problem that directly affects American residents. Yet, our focus on national self-sufficiency sometimes

Congress meals, buffet-style. **Photo by Anne Cloutier**

limits the degree to which we seek to learn from other more experienced nations.

Daily decisions regarding solid waste, such as recycling the morning newspaper rather than throwing it into a trash can, or re-using a lunch bag several times, can bring about significant resource savings. Reducing, reusing and recycling can greatly influence global supplies of a variety of natural resources. Fuel use, too, can be substantially reduced by the compounded actions of people who put on sweaters rather than turning up the thermostat and wash only full loads of dishes and clothes.

Housing, utilities, lawn care, recreation—all of these, and more, are areas in which we make personal decisions that have unnoted but far-reaching effects. With global environmental education, and more specifically, learning to think globally while acting locally, we can begin to account for our impacts on the world environment. As people—individuals in every nation—learn to consider the implications of their actions for the rest of the world and to act accordingly, progress toward a more secure and environmentally sound planet can be made.

We no longer have the option of foregoing a global perspective. There is undebatable need for increased global environmental education, for increased respect for the world environment. Educators—in schools and out of schools—can more effectively prepare the world citizenry to understand, live with, and act responsibly upon the critical truth of the oneness of the world. The "haves" must learn that there are "have nots" and that the resentment and bitterness they bear is perhaps justified. We all must learn that world security literally depends on building a respect for all nations and cultures, and that people the world over have equal rights to acceptance, to peace, and to human dignity. □

The authors wish to credit various global-thinking educators for some of the ideas brought forward in this paper. Graduate students in the environmental education program at the University of Michigan have helped in researching some of the thoughts expressed.

Creative Environmental Education Activities for Young Children

Mary K. Weeks, *Environmental Education Specialist, TVA*
Land Between The Lakes, Golden Pond, KY 42231

The following environmental education activities for preschool-kindergarten children should develop in each child a favorable attitude toward and an interest in the environment, increase children's awareness of their environment and the effects they have upon it, develop the power of observation and develop such additional process skills as identifying, classifying, measuring, and communicating. For single, complimentary copies of a preschool environmental education curriculum guide, contact TVA's Land Between The Lakes, Environmental Education Services, Golden Pond, Kentucky 42231.

Other recommended sources of preschool environmental education activities are: (1) *Hug a Tree,* Sherwood, and Williams, published by Gryphon House, Inc., 1982. (2) *Nature Activities for Early Childhood,* Janet Nickelsburg, published by Addison Wesley, 1976. (3) *Sharing Nature With Children* Joseph Bharat Cornell, Amanda Publications, 1979.

Title: Color Wheels/
Sandpaper Painting

Subject Area: Art; *Level:* Preschool

Time Involved: 1 Hour

Objectives: To increase awareness of colors in Nature, to observe seasonal color changes in nature, and to foster creativity through an art project.

Materials Needed: Color wheels, natural materials (i.e., grass, leaves, rocks, flowers), a sheet of fine sandpaper for each student.

Procedure: **Color Wheel.** Make large color wheels explaining to the children the basic principle of color: primary colors are red, yellow, blue. Secondary colors are produced by mixing two adjacent primary colors. (Laminated color wheels can be used for many years.)

Have the children take their color wheels as they walk around the school grounds. They should be looking for natural materials to use in making natural color wheels. Collect a variety of objects for each color and place them around their man-made color wheels. Share the results with the entire class.

Discuss: Which color were easy to find in nature? Which were hard to find? How would the activity change through the seasons?

Sandpaper Painting. Now give each child a piece of fine sandpaper and instruct the class to paint a picture with their natural paints! Demonstrate how flowers, leaves, and grass can be used as color pigments by rubbing across the sandpaper. Rocks and charcoal can be used to make simple line pictures. Natural materials can be used to color the picture.

Discuss: Nature colors are functional: bright flowers attract bees and insects required for pollination, green indicates food-making chlorophyll, rock colors indicate mineral content.

Title: Camouflage Hunt

Subject Area: Math/Science;

Level: Preschool

Time Involved: 30 Minutes

Reference: Project Learning Tree

Objectives: To illustrate the importance of camouflage in the natural environment; to reinforce color identification; and to reinforce such math skills as counting and sorting.

Materials Needed: Pipe cleaners in a variety of colors

Procedure: Prior to activity, distribute pipe cleaners in the natural environment (i.e., on the ground, low-hanging tree branches, tree bark, etc.).

Have children pretend that they are birds that must survive for a day in their world. That day will last only five minutes. Discuss requirements for survival: food will be a major concern. Children will state that many birds need worms to survive. At this point, show children pipe cleaners which will be their imaginary worms. Their task will be to find as many worms (pipe cleaners) as possible. Define boundaries. As children swoop down to collect their worms, they should make the sound

of the bird they are pretending to be. Bring students together to discuss results. Sort pipe cleaners by color. Which colors were easiest/hardest to find? Why? Discuss camouflage and protective coloration. Have children identify animals/insects that utilize camouflage. How do humans use camouflage?

Repeat this activity in a different environment to see if results differ.

Follow up: Show children examples of camouflage in nature that are illustrated in magazines or books.

Title: Nature's Kaleidoscope
Subject Area: Math, Science
Level: Preschool
Time Involved: 30 Minutes
Objectives: To introduce concept of protective coloration in nature; to reinforce math skills of counting and sorting; and to reinforce color identification.

Materials Needed: 100-200 colored toothpicks (evenly divided with red, green, yellow, brown, blue, and natural); pictures of protective coloration (camouflage) in animals (i.e., deer, snakes, birds).

Procedure: Select an area outside that has a variety of ground cover (i.e., forest floor covered with leaves, grassy area or bare soil). Prior to activity, scatter toothpicks on the ground. Bring children to the area and tell them that there are toothpicks hidden on the ground. Define boundaries. At a signal, children should collect as many toothpicks and divide them according to color.

Discuss: Which colors were easy to find? Which were hard to find? Generally, toothpicks with a color similar to the ground cover will be found last. Relate this to protective coloration of animals and how this helps to camouflage them from predators (enemies). How does man use protective coloration?

Show children pictures of examples of protective coloration in animals.

Discuss how bright colors often help to distract a predator (such as a predator which is led away from a nest by the flight of a brightly colored male) or attract a species for pollination (such as bees to bright flowers). Show examples of these.

Title: Baggage Tags
Subject Area: Language Arts/Math
Level: Preschool/Kindergarten
Time Involved: 30 minutes
Objectives: To provide individualized learning activities; to review colors, shapes, textures; and to review alphabet and phonic skills.

Materials Needed:/ Variety of baggage tag cards.

Procedure: Prior to activity, make a variety of baggage tag cards and laminate. Examples of cards might include sets on colors, shapes, textures. Other sets could include alphabet letters, pictures to reinforce beginning sounds and tree bark rubbings.

To begin color baggage tag activity, give each child a baggage tag with a small square of color on it. Each child should find something in nature that matches that color and place the tag next to it. Call group together and have children show group their tags and discuss results.

Each set of baggage tags can be done in this manner.

For the beginning sounds tags, each student is given a tag with a letter on it and must find something that starts with that letter. To make this activity more difficult, each child can be given a tag with a picture on it and is told to find an object that starts with the same letter as the picture on the tag.

For matching tags, put tags with the beginning letter of objects in the school yard. Each child is given a tag with a matching letter. In a group, or individually, the students should find a matching letter and tie the tag beside it. To make this more difficult, one tag can be a capital letter and one can be a lower case letter. □

Ballad on ANSS 75th Anniversary by Dick Baldauf

ANSS Past President Dick Baldauf singing the ballad of ANSS.
Photo by Ray Pfortner

Nature Study, that's the way to go
Anniversary, seventy-five, I know
Now we gather to look ahead
some years
Nature Study has no fears.

Look at that plant
Look at that ant
Look at that view
...that's what we like to do!

Nature Study, that's the pub you need
It all started from a tiny seed.
Liberty Hyde Bailey did the
planting then.
Nature Study, here's my pen.

Look at that frog.
Look at that bog.
Look at that blue.
...that's what we like to do!

Nature Study, when reports tell you
How to teach kids the kinds of
things to do
For our planet, the one we claim
with greed
Nature Study...it's great to read.

Look at that mouse.
Look at that grouse.
Look at the new.
...that's what we like to do!

Nature Study, relationships of all
Ecosystems are its constant call.
Predator-prey or cold melting ice.
Nature Study, it's so nice.

Look at mitosis.
Look at sclerosis.
Look at that few.
...that's what we like to do!

Nature Study, the journal of ANSS
The group reached 75 with the
help of Spence,
Padalino, Russell, John Gus, too
As Nature students, we love you.

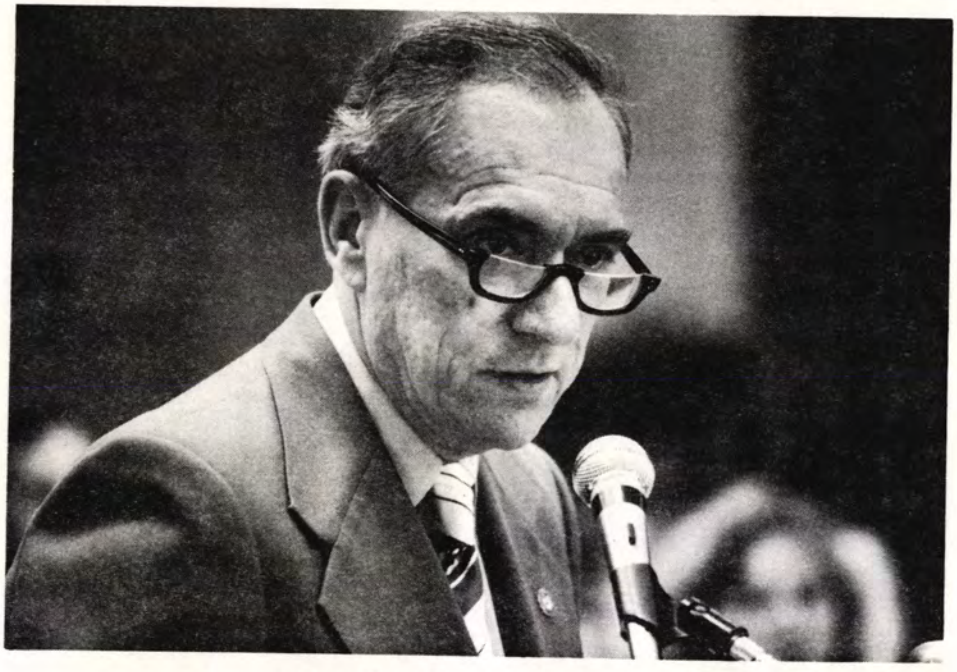
Look at that rock
Or the plant called dock.
Look at the zoo.
...that's what we like to do!

Look far ahead, without a nod or shirk
We'll start the next quarter with
John J. Kirk
Now watch us friends and you
will know
Nature Study's on the go.

Look at the earth.
Look at its birth.
Look for a clue.
...that's what we like to do!

Opening Remarks by John J. Kirk

On Assuming the Presidency of the American Nature Study Society



Inauguration speech by ANSS President John Kirk. **Photo by Ray Pfortner**

As I accept the gavel, which is the symbol of the Presidency of the American Nature Study Society, from my good friend, Talbert Spence, I feel the mixed emotions of gratitude, pride, and humility. First, gratitude to the members of the Society for making this all possible, and a sense of pride at being permitted to function in this role, and a sense of humility upon reading the scroll which lists the signatures of all past presidents. This list reads like a Conservation Hall of Fame for the United States and it is certainly a humbling experience to be included in the company of such distinguished individuals.

I also wish to offer a special thank you to my friend, Talbert Spence, for he did so much during his two year term to extend the objectives and goals of this organization, and the time he has spent with me, preparing me to continue the efforts which he initiated, is most appreciated. I also want to thank Jack Padalino, who preceded Spence. Jack is a former student of mine and now I find myself following him. He, too, has been very helpful in making suggestions on plans for the future. I also want to congratulate all of the award winners today and very special congratulations to all the past presidents, whose efforts and skill have made it possible for us to celebrate the Seventy-fifth Anniversary of the American Nature Study Society.

It also seems most fitting that we are here in at the University of Vermont for this celebration. For it was here on this campus that George Preston Marsh, with his outstanding text entitled *Man and Nature,* published in 1860, first aroused the curiosity and interest of the American people concerning the need for conservation; a goal which the American Nature Study Society has pursued for seventy-five years.

As I begin to serve you, the members of the Society, I feel it is important for all of us to look to the remainder of the eighties and determine that which is most important. I feel that this Society must first continue its traditional role in the conservation/environmental movement that, as you all know, falls in the area of curriculum development, teacher training, adult education, research, and land management. For the past seventy-five years, the American Nature Study Society has been a pioneer in all of these areas and its members have distinguished themselves with their many contributions to the conservation and environment movement.

In addition to these traditional roles, there are two additional areas we must address if the environmental movement is to succeed in this country. First, it is important for all of us to become politically active and work for the election of those individuals who recognize the importance and significance of a quality environment for all people. We cannot afford another four years of the type of leadership we have in Washington today. It is not enough to criticize the miserable efforts of James Watt, for he is merely a symptom. Who is James Watt, anyway? Nothing more than a strange little man with a law degree and a set of misguided and misplaced values. He is not the problem. The problem is in the White House. This is the first time in American history that we have had a President who is actually hostile towards the concepts of conservation and preservation of natural resources. It is because of his value system that James Watt is permitted to continue his tragic and devastating course as Secretary of the Interior.

Not only has this administration wreaked havoc from an environmental point of view in our country, but decisions have been made which have caused the United States to lose the respect and admiration we once held among the community of nations. On October 28, 1982, in the General assembly of the United Na-

PRESIDENT'S MESSAGE (continued)

tions, the World Charter for Nature came up for a vote. This is a wonderful document which states very clearly and concisely the need for all the nations of the world to work cooperatively in the preservation and wise use of natural resources. It calls upon the nations of the world to work toward the concept of a Global Commons concerning the natural resources of the world. When the final vote on this wonderful document was tallied, the results read one hundred eleven nations for the World Charter and one nation opposed. The one negative vote was cast by the representative of the United States of America. This is shocking and unbelievable. I felt compelled to contact some of my friends in other countries and offer my regrets for this decision and inform them that this action does not represent the feeling and concern for resource management felt by most Americans.

We cannot allow this type of leadership to continue. It matters not whether you are Republican, or Democrat, or Independent. First, we must all be Americans, and only through sound environmental policy are the best interests of this country being served. If you wish to pursue the Republican philosophy in government, then seek out the Mark Hatfields of the Republican party. If you choose the Democratic party approach, then seek out the Stuart Udalls in the Democratic party. These are the type of individuals that we must have in the White House. These are the type of individuals who must set the course for the future to protect the natural resources of this country, and the resources of the world. We need a President who is reaching out to negotiate treaties to establish the concept of the Global Commons for the forest resources of the world and a sound policy regarding our precious marine environment. We need to be the leaders in encouraging the United Nations in their noble efforts. Dr. Noel Brown, who was the opening speaker at this Congress, is truly an inspiration in formulating sound environmental policy. We should be encourging him here in North America and applauding his efforts abroad. The United Nations have given us the World Conservation Strategy, one of the most unique documents ever developed. This is the master plan and it is already in place. We must use this document as we develop programs at all levels of education.

Secondly, we must also elect political leaders who recognize the utter stupidity that exists in a nuclear arms race. We must have men and women in the Congress and in the governor's offices and in the White House who will try and use the prestige and influence of this great country to establish first a nuclear freeze and, ultimately, a complete nuclear disarmament. There must never be another nuclear attack anywhere in the world. All one must do is walk the streets of any of the great cities in Japan on the anniversary of the bombing of Hiroshima, as I did two summers ago, and hear the stories of that tragedy where the evidence is still present in the genetic mutations of the survivors. When that bomb was dropped, we did not know of the full consequences of using such an inhumane weapon. Now we know, there will be no excuse the next time and we must see that there never is a next time. A nuclear holocaust is the greatest environmental threat to survival and must be eliminated.

These are the areas of concern as we view the eighties. It is my hope that all of you who are members of the American Nature Study Society will lend me your support and offer your suggestions and guidance as we continue our efforts to preserve and enhance the natural resources of this country and the world.

There is an organization called the Christophers who have as their motto, "It is better to light one candle than to curse the darkness." I would like to suggest that if each of us would light our candle and hold it high and share that light and call upon the members of the other conservation groups that comprise this Congress to also hold their candles high in unison with us, then the resulting glow would illuminate the world. Let this be our goal during the remainder of the eighties. □

SNOW/April 19

Morning dawns in sudden snow.
Daffodils lean under the weight.
They spring back when I shake them,
Ten minutes and I am pushing off
more wet snow.
But there is no let-up.
Their faces are on the ground.

Maxwell Corydon Wheat, Jr.

Corrections and Additions to the 75th Anniversary Issue Vol. 37, Numbers 1 and 2

The happy birthday sun on the cover was drawn by Jasmine Lubbe, ten year old daughter of John Lubbe, as part of a farm mural.

Talbert Spence (p. 30) joined ANSS in 1974.

The pile of cans illustrating *Humans in the Food Chain* (p. 35) is tipped on its side. Turn it upright and you will see how the whole ecosystem will come crashing down as "ecological management decisions" eliminate various "lower groups."

The American **NATURE STUDY** *Society*

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Nature-study is not synonymous with the old term "natural history," nor with "biology," nor with "elementary science." It is not "popular science." It is not the study of nature merely. Nature may be studied with either of two objects: to discover new truth for the purpose of increasing the sum of human knowledge; or to put the pupil in a sympathetic attitude toward nature for the purpose of increasing his joy of living. The first object, whether pursued in a technical or elementary way, is a science-teaching movement, and its professed purpose is to make investigators and specialists. The second object is a nature-study movement, and its purpose is to enable every person to live a richer life, whatever his business or profession may be.

– Liberty Hyde Bailey, 1903

First President American Nature Study Society

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